Ocean Chemistry Data Report: Alice Arm, Observatory Inlet; Part 1, December 1981, January 1982, June 1982, January 1983

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Canadian Data Report Of Hydrography and Ocean Sciences

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OCEAN CHEMISTRY DATA REPORT : ALICE ARM, OBSERVATORY INLET; PART 1, DECEMBER 1981, JANUARY 1982, JUNE 1982, JANUARY 1983

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ABSTRACT

Macdonald, R.W., M.C. O'Brien, D.M. Macdonald 1984. Ocean Chemistry Data Report: Alice Arm, Observatory Inlet; Part 1 December 1981, January 1982, June 1982, January 1983. Can. Data Rep. Hydrogr. Ocean Sci. 17 (1), 75 pp.

The preliminary data from four cruises to Alice Arm, B.C., are reported here (Dec. 1981, Jan. 1982, Jun. 1982, Jan. 1983). Included are measurements of salinity, temperature, chlorophyll a silicate, nitrate, phosphate and amounts of material caught in sediment traps.

Key words: Alice Arm, Data, Oceanographic.

RESUME

Macdonald, R.W., M.C. O'Brien, D.M. Macdonald 1984. Ocean Chemistry Data Report: Alice Arm, Observatory Inlet; Part 1 December 1981, January 1982, June 1982, January 1983. Can. Data Rep. Hydrogr. Ocean Sci. 17 (1), 75 pp.

Les données préliminaires obtenues lors de quatre expéditions au bras Alice (C.-B.) sont présentées (déc. 1981, janv. 1982, juin 1982 et janv. 1983). Celles-ci comprennent des mesures de salinité et de température et des dosages de chlorophylle a, silicate, nitrate, phosphate et de matériaux recueillis dans des pièges à sédiments.

Mots clés: Bras Alice, données, océanographie

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INTRODUCTION

As part of an investigation of the transport and fate of mine tailings disposed in a coastal fjord, Ocean Chemistry conducted two cruises to Alice Arm, Hastings Arm and Observatory Inlet. During these cruises the water column and sediments were sampled, and sediment traps were deployed and recovered in Alice Arm. During another two cruises organized by Coastal Zone Oceanography, we deployed and recovered sediment traps in Alice Arm. Additionally, we collected nutrient samples during two other Coastal Zone Oceanography cruises. The background and preliminary data from these cruises are reported in three parts as follows.

Part 1. December 1981, CZO Alice Arm cruise 02 (nutrients)
January 1982, CZO Alice Arm cruise 03 (nutrients)
June 1982, CZO Alice Arm cruise 05 (nutrients, sediment traps)
January 1983, CZO Alice Arm cruise 08 (sediment traps)

Part 2. March 1982, Ocean Chemistry cruise OC-82-IS-001
(nutrients, particulates, trace metals, sediment traps)

Part 3. September-October, 1982, Ocean Chemistry cruise OC-82-IS-003
(nutrients, particulates, sediment traps, sediment cores)

Reported here in Part 1 are nutrients (reactive silicate, phosphate and nitrate plus nitrite) which were sampled by Coastal Zone Oceanography and analyzed at Ocean Chemistry under contract to Seakem Oceanography. Salinity and temperature were taken from Coastal Zone's CTD record for the cast just before the bottlecast. Oxygens were sampled and determined by Coastal Zone Oceanography. Sediment trap collections were made by Ocean Chemistry.

SAMPLING STATIONS

We have used the same sampling stations and terminology as Coastal Zone Oceanography. To avoid conflict, we placed our sediment traps near but not exactly at four of the regular stations in Alice Arm; ST-1 (AA-1), ST-2 (AA-2), ST-3 (AA-3), ST-4 (AA-4). Station locations are shown in Figure 1 with exact coordinates listed later in the tables. The arrangement of sediment traps in longitudinal section is shown in Figure 2.

SAMPLING METHODS

Sea Water

Samples were collected in 1.7 L Niskin bottles from which subsamples for oxygen and nutrients were drawn. Oxygen samples were taken first, pickled with manganous chloride/alkaline iodide solution and determined within one day of sampling. Nutrients were sampled into screw cap test-tubes (2 plastic, 2 glass) which were transferred immediately to a chest freezer, frozen in the upright position and later placed in labelled Zip-lok bags. Salinities and temperatures reported here were interpolated from computer printout for the corresponding CTD cast, the complete record being archived by Coastal Zone Oceanography. Their instrument is built by Guildline Instruments Ltd. (Analogue CTD Model #8700). The instrumental resolution and accuracy for equivalent salinity, temperature and pressure are listed in Table 1.

Sediment Traps

Sediment traps (Figure 3) consisted of PVC cylinders, 48.3 cm high with a diameter of 13.9 cm (aspect ratio=3.5). Baffles were placed in the top (grid size 1.3 x 1.3 x 5 cm) and in the sample cup at the bottom (1.3 x 1.3 x 6.4 cm). The collection area of the traps was 0.0129 m^2. Before the first use (March, '82) the traps were washed with soap and water, rinsed with methanol and soaked in 1% HNO for one month. Between cruises the traps were washed and stored in 1% HNO_3 until the next cruise, at which time they were rinsed with Milli-Q water and stored dry in wooden boxes. During transport, the traps were sealed with tight fitting plexiglass lids (Fig. 3) and kept in specially constructed wooden boxes.

Sediment trap deployment

The sediment traps were placed in a paired configuration as shown in Fig. 4. Before placing on the hydrowire, a dense solution was placed in the bottom of each trap by adding approximately 500 mL of 5% NaCl solution. The "a" side was poisoned by adding NaN_3 to the NaCl solution (0.013 g L^{-1}) and also by placing a 15 mL inverted tube into the trap with the bottom sitting in the sample cup. This inversion tube was filled with a solution containing 20% NaCl and 0.48 g L^{-1} of NaN_3. The density contrast would cause this solution to diffuse into the sample cup after deployment.

The traps were moored using stainless steel hydrowire cut to specific lengths for the depths at the four stations in Alice Arm. Stainless steel loops were fastened at pre-measured distances along the wire so the traps could be attached at the required depths.

To deploy the traps, several lengths of iron chain (~200 kg) were connected to the bottom thimble of the wire with a shackle and 1" braided nylon rope. At each station, the weight was placed into the water over the ship's stern ("A" frame) and wire was payed out to the first set of loops. The trap assembly was connected with a stainless steel carabiner at the top and shock cord at the bottom. The two plastic lids were removed and the traps were lowered to the surface where they were allowed to fill flowly. Once full, the wire was again payed out to the next set of loops and the process repeated. Once all the traps were placed on the line and the end of the wire reached, a set of 4 or 5 Viny floats (40 lb buoyancy per float) was attached to the top thimble. Above this was attached a 3/8" polypropylene line with a surface float for retrieval. The 3/8" line was long enough to allow about 5 m free play at high tide. The Viny floats remained submerged by several meters at low tide. Retrieval was carried out in the reverse order. It took between 5-25 minutes to deploy or retrieve each of the trap lines, depending on the water depth and number of traps.

To investigate the behaviour of our trap lines in the ambient current regime we used a sub-surface mooring model and computer program devised by Bell (1979, 1977). Current profiles were estimated from Krauel (1981) for Alice Arm, generally by taking the maximum expected currents at a given depth. The results of the model are plotted in Figure 5 (a,b,c,d). The angle of tilt in the line was found to be generally below 5^{o}, although a tilt of 8^{o} was possible at the bottom of station ST-2 during maximum currents.

During the March cruise (reported in part 2) rhodamine B dye was used to investigate the possibility of trap flushing, either during the sampling period, or during deployment/recovery operations. At station 1, outside the Alice rock sill (probably the most dynamic of the trap locations) no dye was evident when the traps were recovered after a period of about 10 days. (This was the longest collection period during the study.) Dye remained in all of the other traps where it had been placed.

Subsampling of sediment traps - June 1982

After recovery, the traps were placed back in their boxes with the plastic lids sealing them from the ambient environment and the contents were allowed to settle for several hours. Figure 6 shows schematically the sediment trap subsampling process. The traps were brought into an enclosure constructed from plastic sheeting in which the air was filtered. Here, water was drained from a spigot above the sampling cup and baffle. In all cases this water was clear. Some of the water was saved in a wash bottle for rinses. The bottom of the sediment trap was unscrewed and the sample cup removed. The baffle was removed, care being taken to rinse any sediment back into the cup. The sediment in the cup was passed through a 333 μm Nitex sieve and into a 1 L acid cleaned polybottle. The polybottle was labelled, bagged and stored in a dark cooler at 4 C until further subsampling. The

portion greater than 333 μm was back-washed off the sieve using pH 8 Milli-Q water and filtered onto a 0.1 μm Nuclepore filter. This was stored frozen in a petri-slide and returned to the lab for microscopic examination and dry weight determination. The sample in the polybottle (333 μm fraction) was subjected to the following procedures after the total volume had been measured.

1. A 10 mL sample was filtered through a 2.5 cm GF/C filter, sprayed with a 1% $MgCO_3$ suspension, folded into a Whatman #1 filter, labelled and placed in a darkened bottle with silica gel in a chest freezer. This was returned to the lab for chorophyll a determination.

2. A 15 mL sample was placed in a small glass vial, preserved with 5 mL of 5% buffered formalin and stored in a cooler at 4°C for microscopic examination.

3. From the sediment traps which had not been preserved with NaN_3 (b side), samples were removed without further sieving. A 20-30 mL sample was taken for POC, PON determination and filtered through a 47 mm GF/G filter which was rinsed, folded and wrapped in Aluminum foil, frozen and returned to the lab. Method of treatment of this sample and results are reported elsewhere.

The remaining volume was divided into two or three portions by pouring into 250 mL plastic cylinders. The total content of each cylinder was filtered through 0.4 μm, 47 mm, acid-cleaned nuclepore filters (6N HCl overnight followed by 0.1% HNO_3 overnight, rinsed with Milli-Q water, dried at 40°C overnight and weighed). The material remaining on the filters was rinsed with three 10 mL portions of pH8 Milli-Q water and stored in acid cleaned petri-slides in a freezer. These were returned to the lab for dry weight determination and metal analyses.

4. From the traps poisoned with NaN_3 (side a), after chlorophyll a and microscopic samples were removed, the remaining volume was passed through a 64 μm Nitex screen. The 64-333 μm fraction was washed off the sieve with pH8 Milli-Q water. This fraction was divided volumetrically, approximately one fifth being used for POC, PON determinations (treated as described in 3 above) and the remainder was filtered onto an acid cleaned preweighed 0.4 μm 47 mm nuclepore filter. This was stored in an acid cleaned petri-slide, frozen and returned to the lab for dry weight and metal determinations. For the less than 64 μm portion, approximately 30 mL was taken for POC, PON determinations, and the remainder was divided into two or three portions for dry weight and metal determinations. The procedures were the same as described in step 3 above.

During all volumetric manipulations the polybottle was shaken gently to keep the sample well mixed before subsamples were poured out. The subsampling of the trap was done on board CSS Vector during the 3 days following trap retrieval (June 22-June 24/82). All equipment for handling sediment trap material was acid cleaned. Filtration equipment and forceps were rinsed for 24 hours in 6N HCl and approximately 1 month in 1% HNO_3.

The 1L polybottles, funnels, graduated cylinders, polyethylene beakers and inversion tubes were soaked for about one month in 1% HNO_3 between cruises. The nitex screens were soaked in 10% HCl overnight and then 1% HNO_3 overnight (This procedure did not affect screen size.).

Subsampling of sediment traps - January 1983

After recovery, the traps were treated in the same manner as in June 1982. However, after transferring the trap contents to the 1 L polybottles, these were stored at 4°C in the dark and returned to Ocean Chemistry for subsampling in the trace metal clean room. Approximately 10 days elapsed between placing the trap contents in polybottles and subsequent subsampling in the lab.

Steps 1 and 2 of the subsampling described for the June '82 cruise were repeated. Step 4 was carried out for all sediment traps (a and b side).

For the traps at 150 m, Station 4, a different procedure was employed. Three extra wet sieve steps were used (500 μm, 202 μm and 35 μm) to divide the material. Procedures for preparing POC, PON, chlorophyll a microscopic and metal samples were the same as described above.

ANALYTICAL METHODS

Oxygen

Oxygen was determined by the methods outlined in Strickland and Parsons (1972).

Nutrients

Nutrients were determined using Technicon Autoanalyzer II components. Reactive silicate and nitrate plus nitrite were determined according to Technicon Industrial Methods No. 186-72 W and 158-71 W respectively, and soluble orthophosphate was determined by a modified Technicon method (Brynjolfson, 1973). Sagami primary standards, prepared in 3.05% NaCl solutions were used for calibration. The instrument was calibrated twice each day (3 points in triplicate, $r > 0.9999$) and readings were interpolated to allow for daily drift (<1.2%). Before analysis, samples were thawed an appropriate time depending on solubility and storage time (Macdonald and McLaughlin, 1982). For these data sets we evaluated precision by selecting random blind replicates which are reported in the data tables. This measures error due both to bias and random fluctuation. For each data set, a pooled estimate of variance was calculated for each nutrient as $s_p^2 = \frac{1}{2n} \Sigma \Delta^2$ where n is the number of replicates and Δ the difference between duplicates. The results are summarized in Table 1.

Sediment Trap Materials

Sediment trap particulates were determined by drying the filters at 40° overnight or longer until they came to constant weight. They were weighed on a Perkin-Elmer auto-balance (AD-2) to the nearest 0.1 mg. Calibration was carried out in accordance with the instruction manual using class 5 NBS weights. The instrument is very linear, and calibration does not appear to contribute significantly to error (see Macdonald et al. 1983). The major weighing problem is static on the filters and this we have avoided by using a Poα source static eliminator and an anti-static gun. Filter blanks are well below the 0.1 mg level. We have determined the detection limit ($3s_B$) and the quantification limit ($10s_B$) to be 0.15 mg and 0.50 mg respectively. Here we are weighing quantities in the 100's to 1000's of milligrams, and therefore well above the limit of quantification. To estimate the precision of volumetrically splitting each sample, filtering and weighing, we calculated a pooled-estimate of variance based on the replicates reported in Tables 5(a) and 6(a). For the June cruise we found that the precision expressed as a coefficient of variation was ± 1.5% (1s) for the traps containing normal quantities of material. For the deep traps at Station 4 where large amount of particulates were settling, precision was better (∿ ± 0.2%). For the January cruise repeatability was better than 1.2% (1s) for 18 sets of duplicates. The difference between replicate traps moored at the same depth (a and b sides) was slightly larger with an average coefficient of variation of 5% for June (15 duplicates) and 4.5% (9 duplicates) for January.

Absolute accuracy can be affected by salt retention, incomplete capture of material by the filter, and balance inaccuracy. We have calibrated with class 5 (NBS) standards and the latter problem does not contribute significantly (Macdonald et al., 1983). If the material on the filter comprised 50% salt water (30 °/oo), and no rinses were used, salt would contribute, at most, 1% of the total weight. Therefore this source of bias appears to be potentially only a small factor. As noted above the 0.4 µm filter size by definition separates particulate and dissolved. With the amounts of sediment involved in the traps (70-90,000 mg) we do not believe filter losses contribute much, and certainly less than 1%. For example, the concentration of particulate matter in the samples from the sediment traps was ∿1000 mg L^{-1} or more. We can visually detect water with 4 mg L^{-1} by its turbidity. Since filtered water was always clear, less than 0.4% of the material could have been lost in the filtrate. However, we have no absolute check on the accuray or efficiency of the sediment traps themselves, although replicates indicate that they perform with precision.

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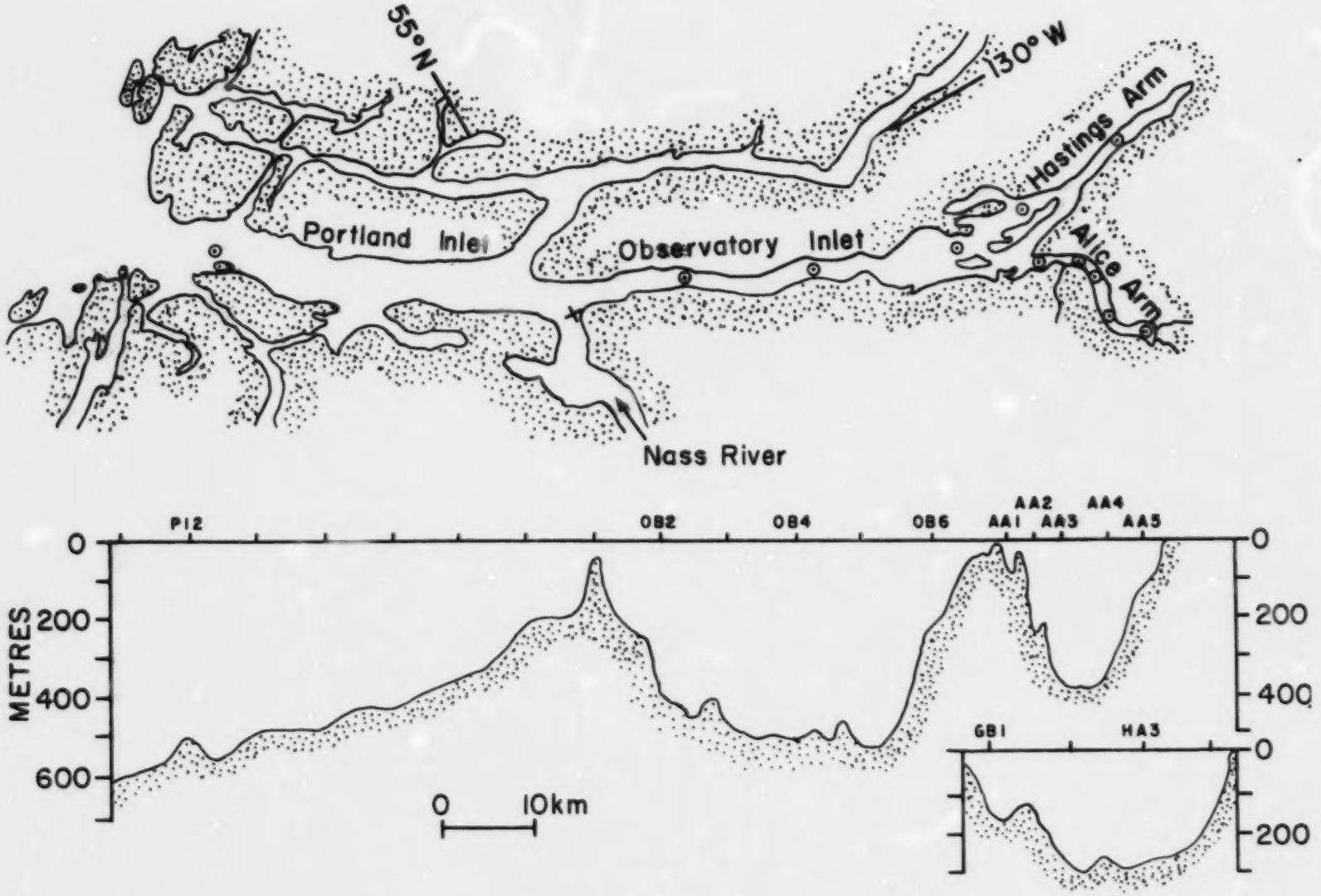


Fig. 1. Station locations

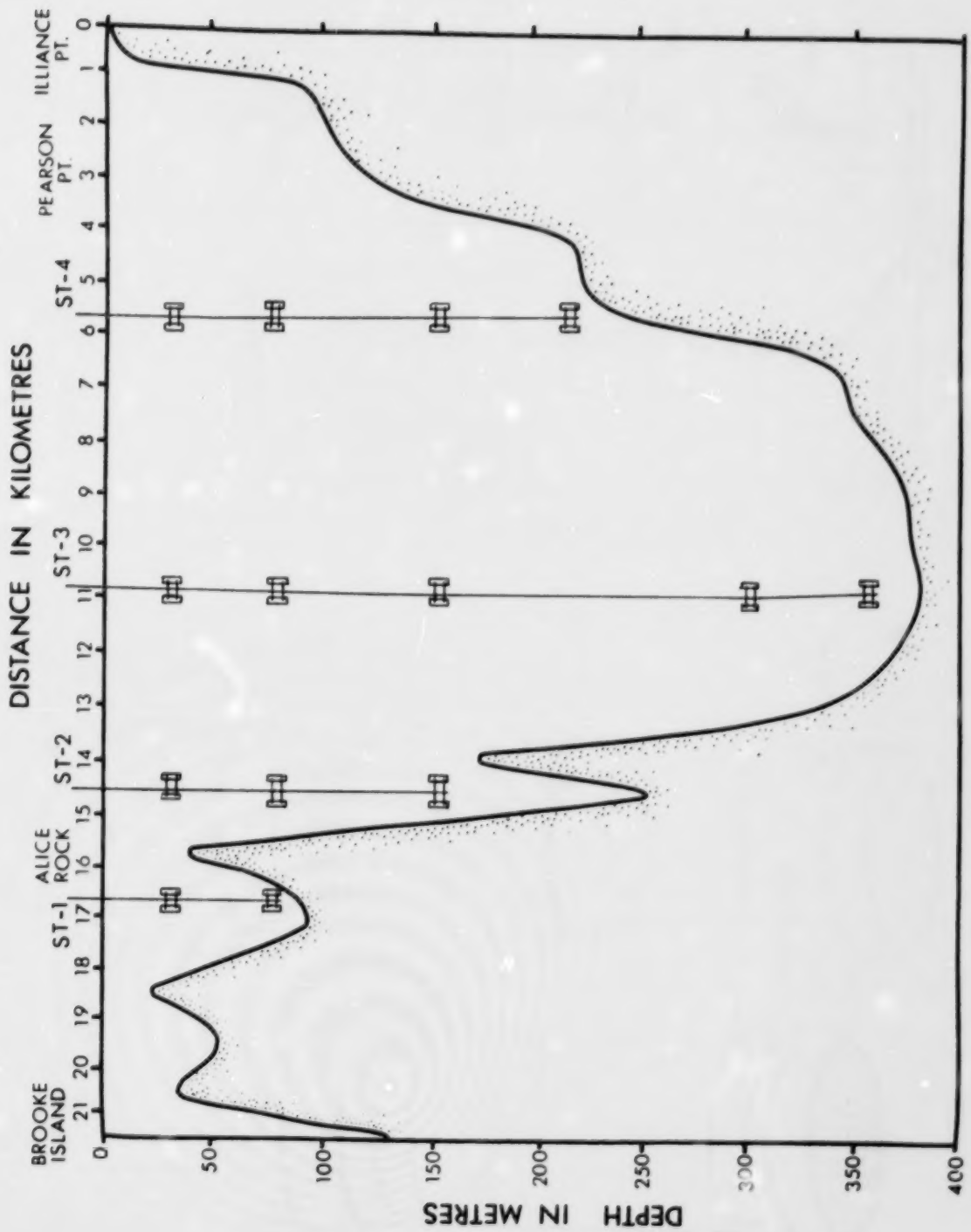


Fig. 2. Sediment trap deployment locations

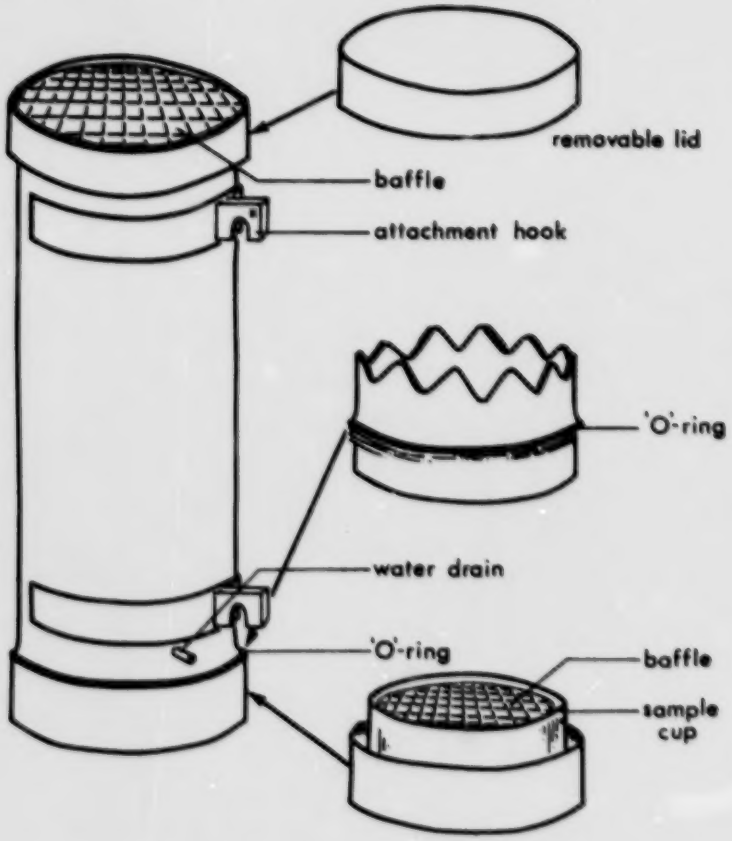


Fig. 3. Sediment trap design

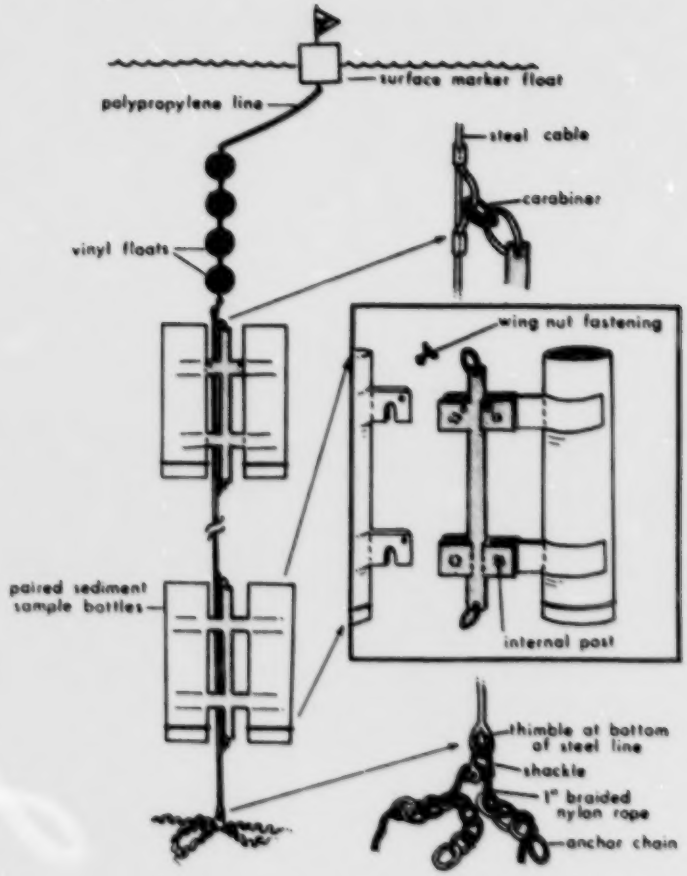


Fig. 4. Sediment trap deployment

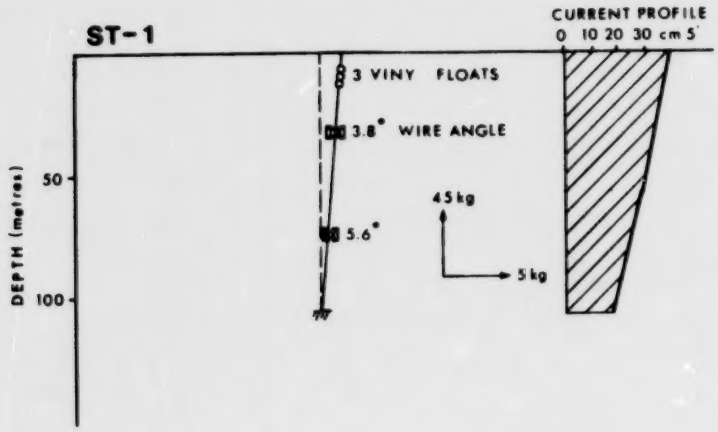


Fig. 5(a). Subsurface mooring model results - ST-1

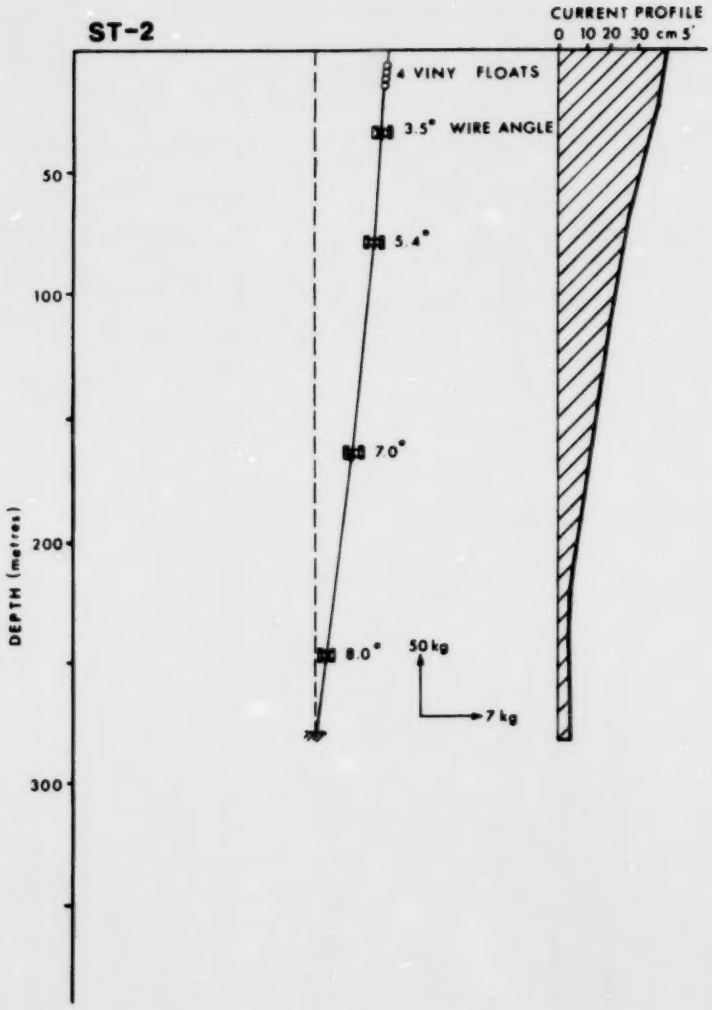


Fig. 5(b) Subsurface mooring model results - ST-2

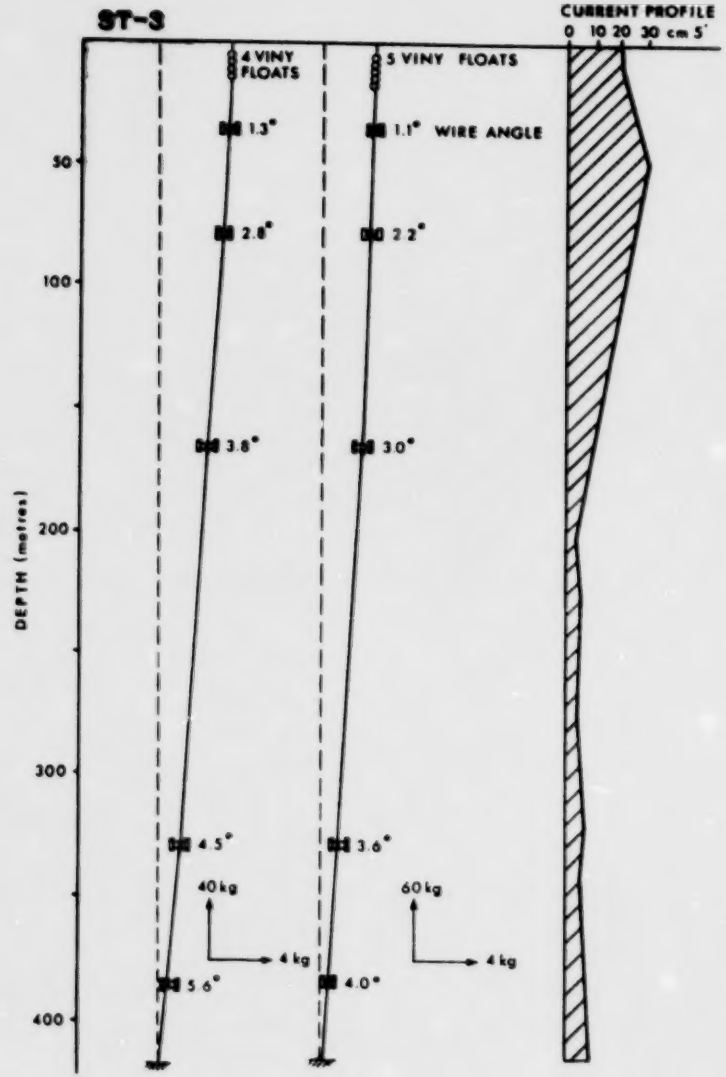


Fig. 5(c). Subsurface mooring model results - ST-3

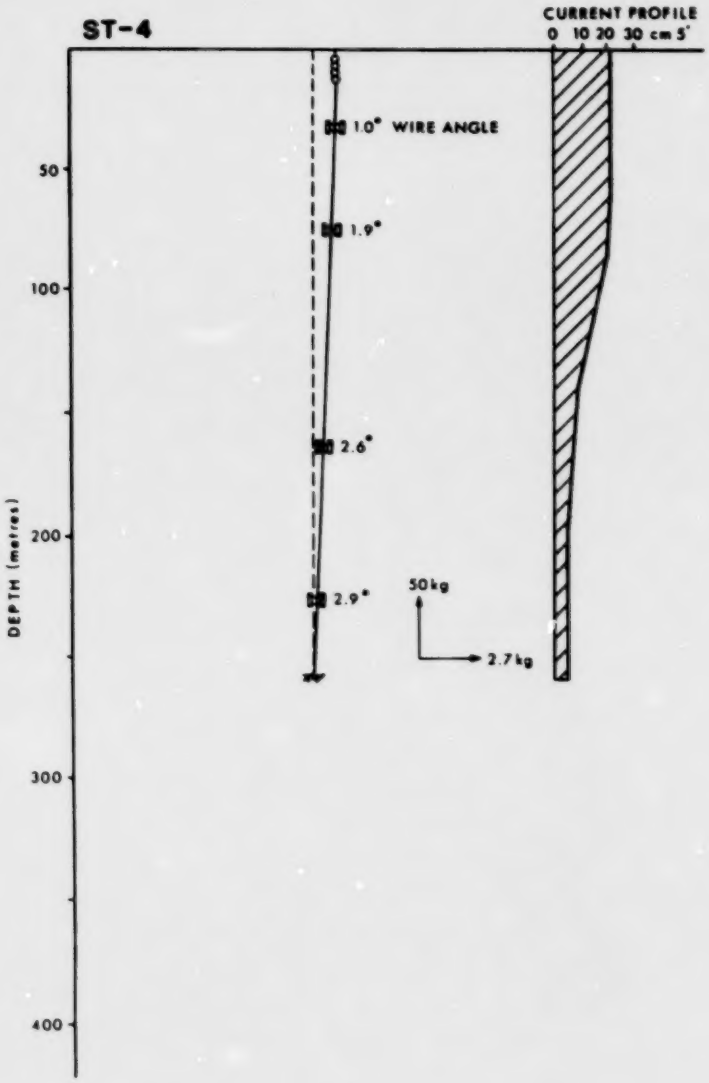
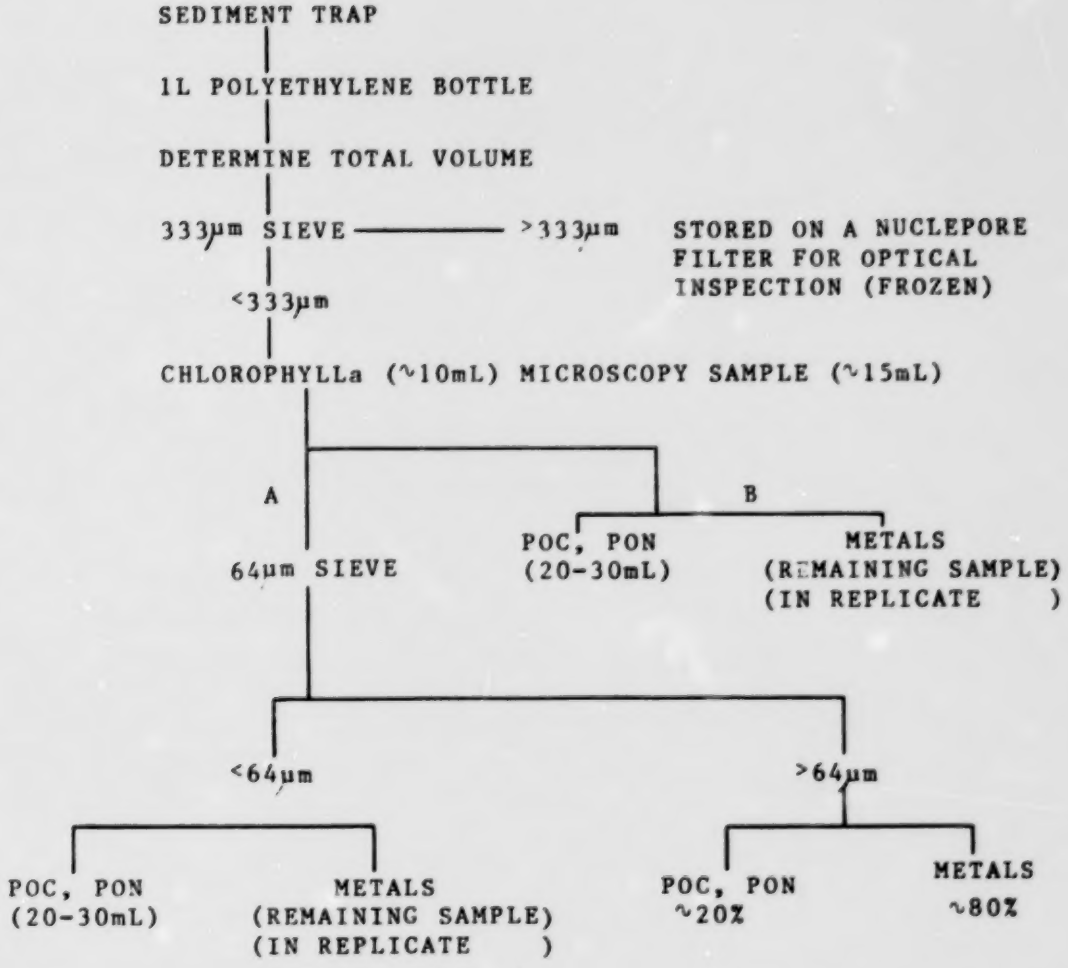


Fig. 5(d). Subsurface mooring model results - ST-4



NOTES

For the June 1982 Cruise, the NaN_3 (a-side) trap material was treated according to branch A while the unpreserved side followed branch B.

For the January 1983 Cruise all trap contents were treated according to route A, with the exception of the traps at 150m, ST-4. Those were treated as shown in Figure 6(b).

Fig. 6(a). Flow diagram for subsampling of sediment trap materials

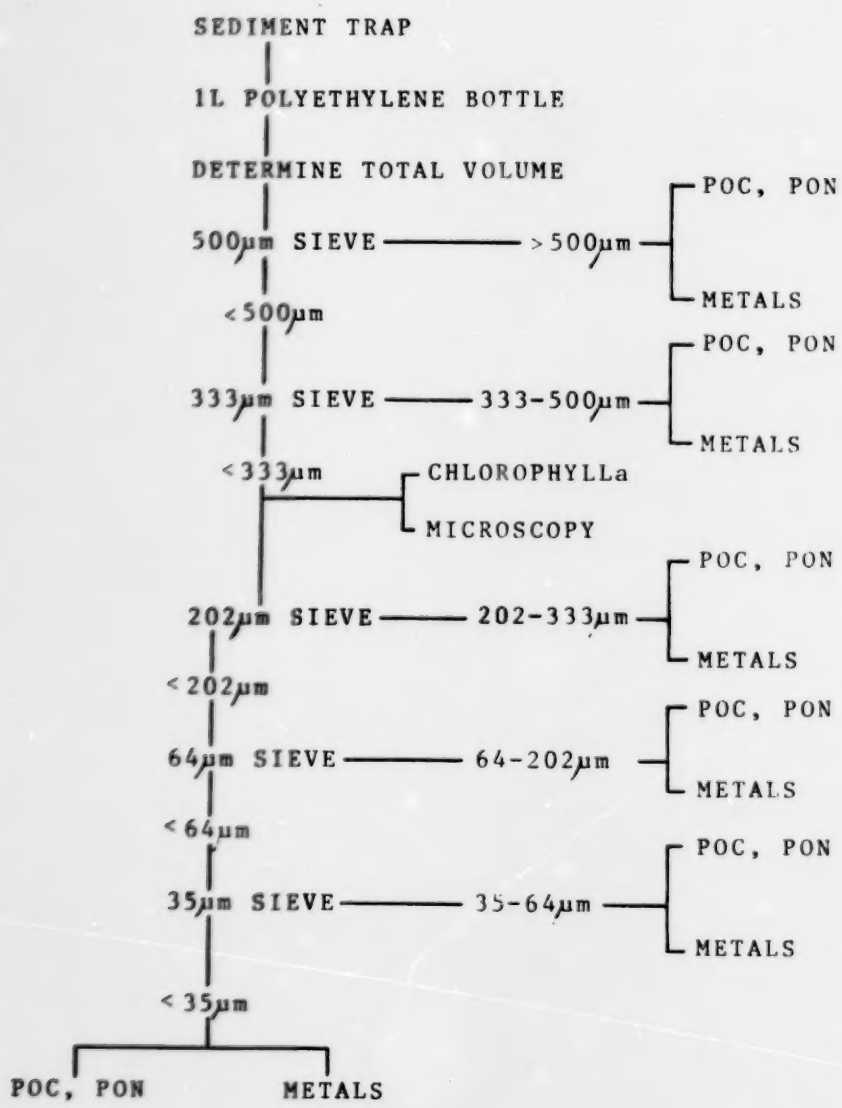


Fig. 6(b). Flow diagram for subsampling of sediment trap materials from ST-4, 150m (January 1983).

Appendix 1.

Data Tables.

TABLE 1. ESTIMATES OF PRECISION, ACCURACY AND DETECTION LIMIT.

Measurement	Date	Precision (1s)	Accuracy (1s)	Detection limit
Salinity (CTD)		$\pm 0.005^{o}/_{oo}$ [4]	$\pm 0.01^{o}/_{oo}$	
Temperature (CTD)		$\pm 0.003\ C^{o}$ [4]	$\pm 0.01\ C^{o}$	
Pressure		$\pm 0.05\%$ FSP [4]	$\pm 0.25\%$ FSP	FSP = 500 db
Oxygen		± 0.09 mmol m^{-3}	Slight negative error at [1] (O_2) <3 mmol m^{-3}	0.16 mmol m^{-3} at 22 mmol m^{-3}, ideal conditions ~0.1 mmol m^{-3}
Silicate	Dec.81	<±4.5% (n=10) [3]	±4.5% [2]	
	Jan.82	<±1.9% (n=12)	±1.9% [2]	
	Jun.82	<±7.5% (n=10)	±7.5% [2]	
Nitrate	Dec.81	<±4.6% (n=10)	±4.6% [2]	~0.05 mmol m^{-3}
	Jan.82	<±0.8% (n=12)	±0.8% [2]	
	Jun.82	<±1.5% (n=10)	±1.5% [2]	
Phosphate	Dec.81	<5.9% (n=10)	±5.9% [2]	~0.03 mmol m^{-3}
	Jan.82	<9.1% (n=12)	±9.1% [2]	
	Jun.82	<9.5% (n=10)	±9.5%	
Sediment traps				
Particulate weight within traps	Jun.	<1.5% (n=27)	No absolute check possible	<0.2 mg
	Jan.	<1.2% (n=18)		
Between traps a and b	Jun.	~±5 %	No absolute check possible	
	Jan.	~±4.5%		

1. Estimate given in Strickland and Parsons (1982) but not evaluated here.
2. Referenced to Sagami standards.
3. n refers to number of duplicate or triplicate determinations.
4. Manufacturers specifications.

TABLE 2. STATION LOCATIONS FOR WATER SAMPLING (CTD, O_2, Nutrients)

STATION	DATE	TIME (Z+8)	LOCATION LATITUDE N	LONGITUDE W
AA-1	7/12/81	1026	55° 24.75'	129° 40.75'
	27/01/82	1630	"	"
AA-2	7/12/81	1057	55° 26.00'	129° 40.05'
	27/01/82	1721	"	"
AA-3	7/12/81	1157	55° 27.15'	129° 37.05'
	27/01/82	1754	"	"
	21/06/82	1355	"	"
AA-3.5	7/12/81	1250	55° 26.94'	129° 33.60'
AA-4	27/01/82	2004	55° 26.69'	129° 31.80'
	21/06/82	1235	"	"
AA-5	7/12/81	1344	55° 27.90'	129° 29.25'
	27/01/82	2128	"	"
HA-1	21/06/82	1955	55° 24.90'	129° 43.10'
HA-3	7/12/81	0727	55° 32.50'	129° 47.10'
	28/01/82	0058	"	"
	21/06/82	1835	"	"
OB-6	7/12/81	0441	55° 21.30'	129° 45.70'
	28/01/82	0405	"	"
	21/06/82	2104	"	"
OB-4	3/12/81	2327	55° 13.90'	129° 51.10'
	28/01/82	0607	"	"
	21/06/82	2259	"	"
OB-2	7/12/81	0056	55° 6.70'	129° 57.30'
	22/06/82	0044	"	"
PI-6	22/06/82	0337	54° 56.10'	130° 6.90'
PI-2	6/12/81	1758	54° 43.80'	130° 24.30'
	28/01/81	1647	"	"
	22/06/82	0615	"	"

TABLE 3. ALICE ARM CHEMICAL DATA (DEC. 1981, JAN. 1982, JUNE 1982).

STATION AA-1 7/12/81 1026 (Z+8) CTD DEPTH 86m
1035 Bottlecast

DEPTH M	TEMP. ^{o}C	SALINITY X10^{3}	SIGMA T * kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
25	7.88	29.83	23.24		1.70	39.2	21.1
50	8.21	30.16	23.45		1.76	39.9	21.1
75	8.42	30.41	23.62		1.83 (1.87)	42.3 (41.2)	21.2 (21.1)

STATION AA-2 7/12/81 1057 (Z+8) CTD DEPTH 258m
1121 Bottlecast

DEPTH M	TEMP. ^{o}C	SALINITY X10^{3}	SIGMA T kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
25	7.23	29.19	22.81		1.71	39.2	21.2
50	7.98	29.92	23.29		1.74	39.9	21.5
75	8.17	30.14	23.45		1.77	41.0	21.5
100	8.18	30.22	23.50		1.77	41.3	21.6
150	7.87	30.43	23.71		1.83	40.1	21.5
200					2.20	58.9	27.7

* Sigma T has been calculated according to the new definition;

$$\sigma_{T\ new} = \left(\rho(S,T,0) - 1000\right)\ kg\ m^{-3}$$

where $\rho(S,T,0)$ is in kg m^{-3}. The offset between the new definition and Knudsen's is;

$$\sigma_{T\ (Knudsen)} - \sigma_{T\ (new)} = 0.025$$

TABLE 3 (CONTINUED)

STATION AA-3 7/12/81 1157 (Z+8) CTD DEPTH 386m
1220 Bottlecast

DEPTH M	TEMP. ^{o}C	SALINITY $X10^{3}$	SIGMA T kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
25	7.63	29.48	22.99	223	1.71 (1.73)	39.6 (39.5)	21.5 (21.5)
50	7.82	29.87	23.27	191	1.78	41.3	22.9
75	8.06	30.06	23.39	193	1.82	41.7	22.8
100	8.05	30.16	23.47	195	1.82	42.0	22.6
150	7.83	30.40	23.69	190	1.85	45.3	23.9
300	5.82	31.23	24.60	145	2.10 (2.02)	64.8 (64.6)	28.5 (28.5)

STATION AA-3.5 7/12/81 1250 (Z+8) CTD DEPTH
1310 Bottlecast

DEPTH M	TEMP. ^{o}C	SALINITY $X10^{3}$	SIGMA T kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
25	7.64	29.48	22.99	211	1.75	39.8	22.3
50	7.47	29.79	23.27	202	1.77	39.8	22.8
75	7.80	30.01	23.39	188	1.77	42.2	23.5
100	7.60	30.09	23.47	190	1.81	42.6	23.1
150	7.45	30.29	23.65	190	1.82	43.8	23.3
200	6.03	31.03	24.41	166	2.13 (1.96)	59.5 (58.6)	27.8 (27.8)
250	5.88	31.18	24.55	151	2.12	62.9	28.4

TABLE 3 (CONTINUED)

STATION AA-5 7/12/81 1344 (Z+8) CTD DEPTH 104m
1353 Bottlecast

DEPTH M	TEMP. ^{o}C	SALINITY $X10^{3}$	SIGMA T kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
25	7.55	29.62	23.11	182	1.83	42.1	24.1
50	7.39	29.81	23.29	178	1.82	43.3	24.6
75	7.49	30.01	23.42	179	1.87	43.5	24.5

STATION HA-3 7/12/81 0727 (Z+8) CTD DEPTH 282m
0745 Bottlecast

DEPTH M	TEMP. ^{o}C	SALINITY $X10^{3}$	SIGMA T kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
25	8.29	30.37	23.60	173	1.76	40.6	22.0
50	8.05	30.89	24.05	167	2.01	46.0	24.5
75	8.00	31.10	24.21	164	2.04	48.2	25.6
100	6.97	31.70	24.82	146	2.22	54.6	28.0
150	6.91	31.98	25.06	144	2.34	56.5	27.9
200	6.88	32.04	25.11	138	2.21	57.0	28.1

TABLE 3 (CONTINUED)

STATION OB-6 7/12/81 0441 (Z+8) CTD 0458 Bottlecast DEPTH 242m

DEPTH M	TEMP. °C	SALINITY X10^3	SIGMA T kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
25	8.69	30.44	23.60	212	1.74	39.0	20.8
50	9.06	31.09	24.05	204	1.82	41.6	21.2
75	8.99	31.31	24.24	194	1.82	41.4	21.2
100	8.68	31.51	24.44	182	1.89 (1.82)	45.4 (52.6)	23.1 (23.2)
150	7.27	32.22	25.20	145	2.29 (2.11)	48.5 (55.0)	24.5 (27.8)
200	6.78	32.63	25.58		2.40	59.1	29.4

STATION OB-4 3/12/81 4/12/81 2327 (Z+8) CTD 0014 Bottlecast DEPTH 503m

DEPTH M	TEMP. °C	SALINITY X10^3	SIGMA T kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
25	8.83	30.49	23.62	218	1.63	38.0	19.6
50	9.25	31.23	24.13	200	1.69	40.1	20.0
75	8.96	31.48	24.38	193	1.78 (1.49)	40.8 (41.9)	21.0 (20.9)
100	8.64	31.64	24.54	177	1.99	45.2	23.2
150	7.07	32.42	25.38	140	2.25	56.0	28.3
200	6.79	32.65	25.59	134	2.44	58.9	29.3
250	6.70	32.74	25.68	132	2.19 (2.47)	60.5 (58.9)	29.9 (29.8)
300	6.68	32.76	25.70	132	2.40	59.8	29.9
400	6.67	32.78	25.72	128	2.51	60.9	29.9
500					2.34	60.7	29.9

TABLE 3 (CONTINUED)

STATION OB-2 7/12/81 0056 (Z+8) CTD DEPTH 430m
0128 Bottlecast

DEPTH M	TEMP. ^{o}C	SALINITY X10^{3}	SIGMA T kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
75	9.46	31.39	24.22	227	1.62	37.5	18.9
150	7.51	32.30	25.23	149	2.22	54.2	27.7
300	6.70	32.77	25.70	131	2.43	59.0	29.9

STATION PI-2 6/12/81 1758 (Z+8) CTD DEPTH 540m
1853 Bottlecast

DEPTH M	TEMP. ^{o}C	SALINITY X10^{3}	SIGMA T kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
25	8.71	30.31	23.49	278	1.43	31.3	16.2
50	9.20	31.07	24.01	279	1.46 (1.26)	27.5 (27.3)	15.7 (15.7)
75	9.33	31.33	24.19	279	1.39	26.5	15.3
100	9.69	31.64	24.38	249	1.53	30.4	16.8
150	7.74	32.77	25.56	152	2.23	53.3	26.8
200	7.20	32.98	25.80	133	2.39	59.3	29.5
250	6.96	33.07	25.91	125	2.48	61.4	30.6
300	6.80	33.15	25.99	121	2.47	62.1	31.3
400	6.50	33.26	26.12	116	2.60	65.2	32.1
500	6.47	33.29	26.14	111	2.60 (2.56)	64.3 (64.1)	32.4 (32.1)

TABLE 3 (CONTINUED)

STATION AA-1 27/1/82 1630 (Z+8) CTD DEPTH 86m
1642 Bottlecast

DEPTH M	TEMP. °C	SALINITY X10^3	SIGMA T kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
25	5.97	31.21	24.57	252	1.90 (1.49)	46.4 (45.5)	22.7 (23.0)
50	6.04	31.31	24.64	249	1.94	46.2	22.8
75	6.14	31.38	24.68	247	1.96	46.2	22.8

STATION AA-2 27/1/82 1721 (Z+8) CTD DEPTH 258m
1829 Bottlecast

DEPTH M	TEMP. °C	SALINITY X10^3	SIGMA T kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
25	5.77	30.81	24.27	259	1.89	45.9	22.8
50	5.84	30.88	24.32	255	1.91	45.9	22.8
75	5.81	30.93	24.36	-	-	-	-
100	5.83	30.98	24.40	256	1.92 (1.68)	45.6 (45.5)	22.9 (23.1)
150	5.88	31.06	24.46	256	1.92	45.6	22.8

TABLE 3 (CONTINUED)

STATION AA-3 27/1/82 1754 (Z+8) CTD DEPTH 386m
1925 Bottlecast

DEPTH M	TEMP. °C	SALINITY X10^3	SIGMA T kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
25	5.97	30.86	24.28	251	1.90	45.9	22.9
50	6.37	30.95	24.31	243	1.90	45.9	22.8
75	6.06	30.95	24.35	230	1.91	45.8	22.9
100	5.88	30.97	24.39	247	1.93 (1.68)	47.0 (47.1)	23.2 (23.4)
150	5.78	31.05	24.46	241	1.94	48.5	23.8
200	5.79	31.06	24.47	246	1.93	47.3	23.4
250	5.81	31.10	24.49	244	1.94	40.2	19.9
300	5.84	31.14	24.52	179	1.96 (1.81)	58.6 (60.4)	26.6 (27.4)

STATION AA-4 27/1/82 2004 (Z+8) CTD DEPTH 278m
2004 Bottlecast

DEPTH M	TEMP. °C	SALINITY X10^3	SIGMA T kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
25	6.10	30.85	24.26	247	1.85	45.3	23.1
50	6.44	30.94	24.30	239	1.89	45.4	23.2
75	6.17	30.95	24.34	295	1.94 (1.66)	46.5 (46.6)	23.3 (23.4)
100	6.02	30.98	24.38	247	1.94	46.7	23.3
150	5.79	31.02	24.44	240	1.92	48.9	23.8
200	5.80	31.06	24.47	229	1.97	49.6	24.3
250	5.80	31.08	24.48		2.05	51.3	24.7

TABLE 3 (CONTINUED)

STATION AA-5 27/2/82 2128 (Z+8) CTD DEPTH 104m
2130 Bottlecast

DEPTH M	TEMP. °C	SALINITY X10^3	SIGMA T kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
25	6.34	30.90	24.28	239	1.94	45.7	23.4
50	6.39	30.94	24.30	234	2.03 (1.73)	46.7 (47.1)	23.6 (23.6)
75	6.09	30.97	24.36	234	2.08	47.1	23.7

STATION HA-3 28/1/82 0058 (Z+8) CTD DEPTH 282m
0102 Bottlecast

DEPTH M	TEMP. °C	SALINITY X10^3	SIGMA T kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
25	6.80	31.59	24.76	211	2.10	46.9	23.8
50	7.05	31.65	24.77	197	2.17	48.6	24.5
75	7.27	31.76	24.84	192	2.14 (1.92)	48.3 (48.9)	24.4 (24.3)
100	6.86	31.75	24.88	187	2.07	46.6	23.7
150					2.33 (2.06)	53.6 (54.4)	26.6 (26.5)
200					2.41	55.7	27.8
250					2.46	56.9	28.1

TABLE 3 (CONTINUED)

STATION OB-6 28/1/82 0405 (Z+8) CTD DEPTH 242m
0433 Bottlecast

DEPTH M	TEMP. °C	SALINITY X10^3	SIGMA T kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
25	5.85	31.44	24.76	267	1.93	43.9	22.6
50	5.91	31.52	24.81	263	1.93	43.2	22.5
75	6.87	31.90	24.99	186	2.03	46.0	23.7
175	7.19	32.35	25.31	183	2.17 (2.06)	49.2 (52.1)	25.1 (25.2)

STATION OB-4 28/1/82 0607 (Z+8) CTD DEPTH 503m
0622 Bottlecast

DEPTH M	TEMP. °C	SALINITY X10^3	SIGMA T kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-2}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
25	5.19	31.27	24.70	278	1.88	43.0	21.9
50	5.33	31.35	24.75	277	1.90	43.2	22.0
75	5.61	31.48	24.82	231	1.95	43.9	22.7
100	6.28	31.75	24.95	187	1.95	44.2	22.8
150	6.87	32.14	25.19	191	2.08	47.0	24.1
200	7.10	32.35	25.32	157	2.22	50.4	25.7
250	7.06	32.50	25.44	128	2.42 (2.17)	55.9 (57.2)	28.2 (28.1)
300	6.92	32.61	25.55	170	2.47	57.3	28.7
400	6.80	32.68	25.62	97	2.51	59.0	29.3
500	6.75	32.71	25.65		2.51	60.0	29.5

TABLE 3 (CONTINUED)

STATION PI-2 28/1/82 1647 (Z+8) Bottlecast DEPTH 540m

DEPTH M	TEMP. °C	SALINITY X10^3	SIGMA T kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
25	6.11	31.11	24.47	260	1.54	29.7	16.4
50	6.53	31.44	24.68	252	1.54	29.7	16.5
75	5.96	31.50	24.80	243	1.71	35.5	19.1
100	6.32	31.95	25.10	224	1.89 (1.76)	40.5 (41.3)	21.4 (21.5)
150	7.33	32.71	25.58	146	2.25	52.5	26.7
200	7.15	32.89	25.74	131	2.39	56.1	28.1
250	7.05	32.95	25.80	124	2.44	57.7	28.9
300	6.97	32.98	25.84	124	2.45 (2.10)	58.2 (60.1)	29.2 (29.1)
400	6.94	33.02	25.87	121	2.48	58.7	29.5
500	6.93	33.05	25.90	112	2.57	61.1	30.2

TABLE 3 (CONTINUED)

STATION AA-3 21/06/82 1340 (Z+7) CTD DEPTH 386m
1455 Bottlecast

DEPTH M	TEMP. ^{o}C	SALINITY $X10^{3}$	SIGMA T kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
25				281	1.33	22.5	12.1
50				256	1.65 (1.39)	30.0 (31.1)	17.5 (18.0)
75				243	1.75	34.6	21.1
100				252	1.71	34.1	21.6
150				252	1.98	38.9	23.3
200					1.78	44.1	21.0
250					1.90	45.7	24.2
300					1.90 (1.87)	46.8 (48.0)	25.0 (25.5)

TABLE 3 (CONTINUED)

STATION AA-4 21/06/82 1215 (Z+7) CTD DEPTH 278m
1335 Bottlecast

DEPTH M	TEMP. °C	SALINITY X10^3	SIGMA T kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
25				260	1.27 (1.39)	20.5 (32.5)	10.3 (10.7)
50				259	1.53	32.9	17.5
75				250	1.60	31.2	18.8
100				254	1.69	32.1	20.6
150				247			
200					1.93 (1.90)	41.8 (43.0)	23.9 (24.2)
250					1.93	44.9	24.6

STATION HA-1 21/06/82 1942 (Z+7) CTD DEPTH 168m
2055 Bottlecast

DEPTH M	TEMP. °C	SALINITY X10^3	SIGMA T kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
25				272	1.50	22.0	15.2
50				186	2.14	49.5	26.8
75				180	2.41	49.7	26.6
100				176	2.23 (2.34)	51.5 (53.5)	26.9 (27.1)
150				172	2.30	52.4	27.2

TABLE 3 (CONTINUED)

STATION HA-3 21/06/82 1803 (Z+7) CTD DEPTH 282m
1935 Bottlecast

DEPTH M	TEMP. °C	SALINITY X10^3	SIGMA T kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
25				311	1.25	11.6	7.5
50				191	2.45		27.7
75				178	2.41	46.5	27.4
100				158	2.37	49.9	27.5
150				130	2.73	61.9	29.2
200					2.36 (2.37)	50.5 (51.8)	26.5 (26.6)
250					2.27	50.9	26.6

STATION OB-6 21/06/82 2027 (Z+7) CTD DEPTH 242m
2204 Bottlecast

DEPTH M	TEMP. °C	SALINITY X10^3	SIGMA T kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
25				215	1.80	38.1	22.5
50				179	2.13	49.8	26.7
75				151	2.58	56.6	28.3
100				149	2.17	57.9	28.8
150				146	2.26	60.1	28.6

TABLE 3 (CONTINUED)

STATION OB-4 21/06/82 2235 (Z+7) CTD DEPTH 503m
2359 Bottlecast

DEPTH M	TEMP. °C	SALINITY X10^3	SIGMA T kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
25				228	1.95 (1.85)	33.9 (35.0)	20.5 (21.5)
50				180	2.29	48.8	25.4
75				167	2.33	57.3	27.0
100				149	2.33	56.8	28.5
150				146	2.47 (2.20)	57.9 (59.7)	28.8 (28.4)
200					2.26	54.1	27.4
250					2.28	51.1	27.2
300					2.41	50.9	27.4
400					2.34	51.7	27.7
500					2.67	51.7	28.1

TABLE 3 (CONTINUED)

STATION OB-2 22/06/82 0027 (Z+7) CTD DEPTH 430m
0144 Bottlecast

DEPTH M	TEMP. ^{o}C	SALINITY $X10^{3}$	SIGMA T $kg\ m^{-3}$	OXYGEN $mmol\ m^{-3}$	PHOSPHATE $mmol\ m^{-3}$	SILICATE $mmol\ m^{-3}$	NITRATE $mmol\ m^{-3}$
25				227	1.84	34.4	21.1
50				197	1.96 (1.75)	43.5 (45.9)	24.9 (25.2)
75				160	2.41	53.8	27.7
100				155	2.43	55.2	27.7
150				154	2.41	55.3	27.5
200					2.50	54.0	27.7
250					2.36	52.8	27.1
300					2.43	53.2	27.1
350					2.09	52.8	27.7

TABLE 3 (CONTINUED)

STATION PI-6 22/06/82 0437 Bottlecast DEPTH 339m

DEPTH M	TEMP. ^{o}C	SALINITY X10^{3}	SIGMA T kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
25					1.85 (2.21)	43.4 (45.3)	24.2 (24.8)
50					2.25	56.3	27.3
75					2.13	53.0	28.1
100					2.24	53.6	28.1
150					2.44	55.0	29.8
200					2.43	56.8	30.4
250					2.41	56.1	30.5
300					2.52	56.8	30.7

TABLE 3 (CONTINUED)

STATION PI-2 22/06/82 0551 (Z+7) CTD DEPTH 540m
0715 Bottlecast

DEPTH M	TEMP. °C	SALINITY X10^3	SIGMA T kg m^{-3}	OXYGEN mmol m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}
25				235	1.70	29.1	18.6
50				183	2.07	46.9	25.8
75				161	2.23	51.8	27.8
100				156	2.34	49.6	28.6
150				154	2.31	54.5	29.7
200				143	2.45	55.6	30.1
250					2.27	56.1	30.4
300					2.36	57.0	30.8
400					2.15	58.5	30.3
500					2.31	58.1	31.0

TABLE 4. SEDIMENT TRAP STATIONS

STATION	LOCATION LAT. °N	LOCATION LONG. °W	TRAP DEPTH (METERS)	DEPLOYED 12/06/82 TIME	RECOVERED 21/06/82 TIME	DEPLOYMENT INTERVAL (DAYS)
ST-1 (95m)	55°24.56'	129°41.12'	30	0820	1645	9.34
			67	0820	1650	9.35
ST-2 (252m)	55°26.20'	129°40.10'	30	0929	1605	9.28
			70	0926	1606	9.28
			150	0923	1608	9.28
			226	0920	1610	9.28
ST-3 (387m)	55°27.13'	129°37.75'	30	1000	1505	9.21
			70	0953	1509	9.22
			150	0947	1513	9.23
			300	0940	1516	9.23
			353	0934	1520	9.24
ST-4 (245m)	55°26.67'	129°31.50'	30	1045	1400	9.15
			70	1040	1405	9.15
			150	1035	1410	9.16
			208	1030	1415	9.16

TABLE 4. SEDIMENT TRAP STATIONS (CONTINUED)

STATION	LOCATION LAT. °N	LOCATION LONG. °W	TRAP DEPTH (METERS)	DEPLOYED 12/06/82	TIME	RECOVERED 21/06/82	DEPLOYMENT INTERVAL DAYS
				15/1/83		21/1/83 [1]	
ST-1 (112m)	55°24.56'	129°41.12'	30	1647		1550	5.96
			67	1645		1552	5.96
ST-3 (382m)	55°27.13'	129°37.75'	70	1604		1500	5.96
			300	1555		1505	5.97
			353	1550		1510	5.97
ST-4 (259m)	55°26.67'	129°31.50'	30	1505		1418	5.97
			70	1502		1420	5.97
			150	1500		1422	5.98
			208	1445		1425	5.99

1 Some sediment traps were lost during rough weather at cape St. James resulting in a reduced sampling program.

TABLE 5(a). SEDIMENT TRAP SUBSAMPLING DATA JUNE 1982

SIDE a - CONTAINED SODIUM AZIDE
SIDE b - NO SODIUM AZIDE

STN.	DEPTH (m)	TIME (DAYS)	SIDE OF TRAP	TOTAL VOLUME (mL)	SIZE FRACTION (μm)	VOLUME FOR MICROSCOPE ANALY. (mL)	VOLUME FOR CHla ANALY. (mL)	VOLUME FOR POC.N ANALYSIS (mL)	SUBSAMPLES FOR METAL ANALYSIS AND DRY WEIGHT DETERMINATION		
									VOL. (mL)	WEIGHT OF SEDIMENT (g)	CONC. (gL-1)
ST-1	30	9.31	a	710	<333	15	8.0				
					64-333			18.5	78	0.2135	0.37
					<64			26.0	206	0.3287	1.60
									218	0.3456	1.59
									222	0.3481	1.57
		9.31	b	690	<333	15	9.8	27	218	0.4965	2.28
									208	0.4666	2.24
									214	0.4743	2.22
	67	9.31	a	800	<333	15	8.1				
					64-333			22	80	0.4103	0.33
					<64			30	244	0.3695	1.51
									234	0.3545	1.52
									242	0.3699	1.53
			b	680	<333	15	7.8	30	212	0.4756	2.24
									182	0.4037	2.22
									220	0.5162	2.35

TABLE 5(a). SEDIMENT TRAP SUBSAMPLING DATA (CONTINUED) JUNE 1982

SIDE a - CONTAINED SODIUM AZIDE
SIDE b - NO SODIUM AZIDE

STN.	DEPTH (m)	TIME (DAYS)	SIDE OF TRAP	TOTAL VOLUME (mL)	SIZE FRACTION (μm)	VOLUME FOR MICROSCOPE ANALY. (mL)	VOLUME FOR CHla ANALY. (mL)	VOLUME FOR POC.N ANALYSIS (mL)	SUBSAMPLES FOR METAL ANALYSIS AND DRY WEIGHT DETERMINATION		
									VOL. (mL)	WEIGHT OF SEDIMENT (g)	CONC. (gL⁻¹)
ST-2	30	9.28	a	570	<333	15					
					64-333			15	76	0.4591	0.96
					<64			21	196	0.4681	2.39
									156	0.3847	2.47
									172	0.4223	2.46
			b	680	<333	15	9.1	26	210	0.6105	2.91
									214	0.6307	2.95
	70	9.28	a	675	<333	15	7.5				
					64-333			18	99	0.4315	0.76
					<64				192	0.5072	2.64
									216	0.5431	2.51
									186	0.4667	2.51
			b	600	<333	15	7.2	25	170	0.6137	3.61
									184	0.6703	3.64
									197	0.7553	3.83

TABLE 5(a). SEDIMENT TRAP SUBSAMPLING DATA (CONTINUED) JUNE 1982

SIDE a - CONTAINED SODIUM AZIDE
SIDE b - NO SODIUM AZIDE

STN.	DEPTH (m)	TIME (DAYS)	SIDE OF TRAP	TOTAL VOLUME (mL)	SIZE FRACTION (μm)	VOLUME FOR MICROSCOPE ANALY. (mL)	VOLUME FOR CHla ANALY. (mL)	VOLUME FOR POC.N ANALYSIS (mL)	SUBSAMPLES FOR METAL ANALYSIS AND DRY WEIGHT DETERMINATION		
									VOL. (mL)	WEIGHT OF SEDIMENT (g)	CONC. (gL-1)
ST-2	150	9.28	a	655	<333	15	7.9				
					64-333			17	98	0.3649	0.65
					<64			27	195	0.3942	2.02
									168	0.3364	2.00
									218	0.4280	1.96
			b	695	<333	15	8.5	26	204	0.5689	2.79
									198	0.5289	2.67
									240	0.6554	2.73
	226	9.28	a	750	<333	15	9.1				
					64-333			22.5	72	0.2587	0.45
					<64			30	210	0.3359	1.60
									238	0.3800	1.60
									234	0.3674	1.57
			b	790	<333			27.5	250	0.5561	2.22
									240	0.5139	2.14
									242	0.5208	2.15

TABLE 5(a). SEDIMENT TRAP SUBSAMPLING DATA (CONTINUED) JUNE 1982

SIDE a - CONTAINED SODIUM AZIDE
SIDE b - NO SODIUM AZIDE

STN.	DEPTH (m)	TIME (DAYS)	SIDE OF TRAP	TOTAL VOLUME (mL)	SIZE FRACTION (μm)	VOLUME FOR MICROSCOPE ANALY. (mL)	VOLUME FOR CHla ANALY. (mL)	VOLUME FOR POC.N ANALYSIS (mL)	SUBSAMPLES FOR METAL ANALYSIS AND DRY WEIGHT DETERMINATION		
									VOL. (mL)	WEIGHT OF SEDIMENT (g)	CONC. (gL-1)
ST-2	150	9.28	a	655	<333	15	7.9				
					64-333			17	98	0.3649	0.65
					<64			27	195	0.3942	2.02
									168	0.3364	2.00
									218	0.4280	1.96
			b	695	<333	15	8.5	26	204	0.5689	2.79
									198	0.5289	2.67
									240	0.6554	2.73
	226	9.28	a	750	<333	15	9.1				
					64-333			22.5	72	0.2587	0.45
					<64			30	210	0.3359	1.60
									238	0.3800	1.60
									234	0.3674	1.57
			b	790	<333			27.5	250	0.5561	2.22
									240	0.5139	2.14
									242	0.5208	2.15

TABLE 5(a). SEDIMENT TRAP SUBSAMPLING DATA (CONTINUED) JUNE 1982

SIDE a - CONTAINED SODIUM AZIDE
SIDE b - NO SODIUM AZIDE

STN.	DEPTH (m)	TIME (DAYS)	SIDE OF TRAP	TOTAL VOLUME (mL)	SIZE FRACTION (μm)	VOLUME FOR MICROSCOPE ANALY. (mL)	VOLUME FOR CHla ANALY. (mL)	VOLUME FOR POC.N ANALYSIS (mL)	SUBSAMPLES FOR METAL ANALYSIS AND DRY WEIGHT DETERMINATION		
									VOL. (mL)	WEIGHT OF SEDIMENT (g)	CONC. (gL-1)
ST-3	30	9.21	a	620	333	15	7.0				
					64-333			17	94	0.0700	0.13
					64			22	278	0.6088	2.19
									282	0.6164	2.19
			b	590	<333	15	7.9	24	270	0.6778	2.51
									272	0.6636	2.44
	70	9.22	a	635	<333	15	6.4				
					64-333			19	89	0.0607	0.12
					<64			20	284	0.5560	1.96
									284	0.5636	1.98
			b	630	<333	15	9.3	26	286	0.6535	2.28
									282	0.6345	2.25

TABLE 5(a). SEDIMENT TRAP SUBSAMPLING DATA (CONTINUED) JUNE 1982

SIDE a - CONTAINED SODIUM AZIDE
SIDE b - NO SODIUM AZIDE

STN.	DEPTH (m)	TIME (DAYS)	SIDE OF TRAP	TOTAL VOLUME (mL)	SIZE FRACTION (μm)	VOLUME FOR MICROSCOPE ANALY. (mL)	VOLUME FOR CHla ANALY. (mL)	VOLUME FOR POC.N ANALYSIS (mL)	SUBSAMPLES FOR METAL ANALYSIS AND DRY WEIGHT DETERMINATION		
									VOL. (mL)	WEIGHT OF SEDIMENT (g)	CONC. (gL-1)
ST-3	150	9.23	a	560	<333	15	7.1				
					64-333			20	87	0.1410	0.31
					<64			29	246	0.5071	2.06
									252	0.5205	2.07
			b	620	<333	15	8.2	23	281	0.6526	2.32
									286	0.6667	2.33
	300	9.23	a	575	<333	15	5.9				
					64-333			19	84	0.2355	0.50
					<64			28	260	0.5517	2.12
									254	0.5385	2.12
			b	615	<333	15	5.9	28	270	0.6975	2.58
									274	0.7061	2.58

TABLE 5(a). SEDIMENT TRAP SUBSAMPLING DATA (CONTINUED) JUNE 1982

SIDE a - CONTAINED SODIUM AZIDE
SIDE b - NO SODIUM AZIDE

STN.	DEPTH (m)	TIME (DAYS)	SIDE OF TRAP	TOTAL VOLUME (mL)	SIZE FRACTION (μm)	VOLUME FOR MICROSCOPE ANALY. (mL)	VOLUME FOR CHla ANALY. (mL)	VOLUME FOR POC.N ANALYSIS (mL)	SUBSAMPLES FOR METAL ANALYSIS AND DRY WEIGHT DETERMINATION		
									VOL. (mL)	WEIGHT OF SEDIMENT (g)	CONC. (gL-1)
ST-3	353	9.24	a	660	<333	15	7.5				
					64-333			21.5	100	0.2403	0.44
					<64			25	272	0.9415	3.46
									268	0.9345	3.49
			b	670	<333	15	6.8	28	278	1.1553	4.16
									278	1.1622	4.18
ST-4	30	9.23	a	640	<333	15	5.3				
					64-333			17	85	0.0887	0.17
					<64			25	284	1.0071	3.55
									286	1.0175	3.56
			b	605	<333	15	6.2	14	280	1.1395	4.07
									274	1.1054	4.03
	70	9.23	a	590	<333	15	7.0				
					64-333			18	95	0.1899	0.38
					<64			23	268	1.7167	6.41
									265	1.7447	6.58
			b	690	<333	15	6.3	14	286	1.7331	6.06
									298	1.7810	5.95

TABLE 5(a). SEDIMENT TRAP SUBSAMPLING DATA (CONTINUED) JUNE 1982

SIDE a - CONTAINED SODIUM AZIDE
SIDE b - NO SODIUM AZIDE

STN.	DEPTH (m)	TIME (DAYS)	SIDE OF TRAP	TOTAL VOLUME (mL)	SIZE FRACTION (μm)	VOLUME FOR MICROSCOPE ANALY. (mL)	VOLUME FOR CHla ANALY. (mL)	VOLUME FOR POC.N ANALYSIS (mL)	SUBSAMPLES FOR METAL ANALYSIS AND DRY WEIGHT DETERMINATION		
									VOL. (mL)	WEIGHT OF SEDIMENT (g)	CONC. (gL-1)
ST-4	150	9.23	a	635	<333	15	3.6				
					64-333			12	95	0.4303	0.76
					<64			13	296	2.9277	9.89
									280	2.8075	10.03
			b	610	<333	15	4.4	11	292	3.3716	11.55
									294	3.3961	11.55
	208	9.23	a	665	<333	15	6.0				
					64-333			12	115	2.9135	4.81
					<64			9	282	11.1249	39.45
									280	11.0626	39.51
			b	745	<333	15	3.1	10	284	12.5378	44.15
									280	12.3243	44.02

TABLE 5(b). AMOUNTS CAUGHT IN SEDIMENT TRAPS, JUNE 1982

STATION	DEPTH (m)	TOTAL SEDIMENTATION $gm^{-2}day^{-1}$ DRY WEIGHT ($\bar{X}\pm s$ (n)) a) NaN_3	b) No Preservative	AVERAGE TOTAL SEDIMENTATION $gm^{-2}day^{-1}$ a and b sides $\bar{X}\pm s$	% COARSER THAN 64μm
ST-1	30	11.56 ± 0.10(3)	12.91 ± 0.18(3)	12.24 ± 0.95	19
	67	12.31 ± 0.06(3)	12.86 ± 0.37(3)	12.59 ± 0.39	18
ST-2	30	16.19 ± 0.27(3)	16.64 ± 0.16(2)	16.42 ± 0.32	28
	70	18.66 ± 0.55(3)	18.51 ± 0.59(3)	18.59 ± 0.11	23
	150	14.47 ± 0.22(3)	15.85 ± 0.34(3)	15.16 ± 0.97	25
	226	12.78 ± 0.00(3)	14.32 ± 0.30(3)	13.56 ± 1.09	22
ST-3	30	12.11 ± 0.00(2)	12.31 ± 0.23(2)	12.21 ± 0.14	5.6
	70	11.16 ± 0.08(2)	12.02 ± 0.13(2)	11.59 ± 0.61	5.7
	150	11.20 ± 0.03(2)	12.11 ± 0.04(2)	11.66 ± 0.64	13
	300	12.67 ± 0.00(2)	13.33 ± 0.00(2)	13.00 ± 0.47	19
	353	21.73 ± 0.13(2)	23.44 ± 0.08(2)	22.59 ± 1.21	11
ST-4	30	19.11 ± 0.04(2)	20.58 ± 0.14(2)	19.9 ± 1.00	4.6
	20	32.21 ± 0.59(2)	34.89 ± 0.32(2)	33.6 ± 1.90	5.5
	150	53.12 ± 0.53(2)	59.18 ± 0.00(2)	56.2 ± 4.30	7.1
	208	247.40 ± 0.30(2)	275.90 ± 0.60(2)	262. ±20.	11

TABLE 6(a). SEDIMENT TRAP SUBSAMPLING DATA JANUARY 1983

SIDE a - CONTAINED SODIUM AZIDE
SIDE b - NO SODIUM AZIDE

STN.	DEPTH (m)	TIME (DAYS)	SIDE OF TRAP	TOTAL VOLUME (mL)	SIZE FRACTION (μm)	VOLUME FOR MICROSCOPE ANALY. (mL)	VOLUME FOR CHla ANALY. (mL)	VOLUME FOR POC.N ANALYSIS (mL)	SUBSAMPLES FOR METAL ANALYSIS AND DRY WEIGHT DETERMINATION		
									VOL. (mL)	WEIGHT OF SEDIMENT (g)	CONC. (gL-1)
ST-1	30	5.96	a	520	<333	15	11.8				
					64-333			29	30	0.0263	0.099
					<64			56	223	0.1741	0.781
									217	0.1715	0.790
			b	610	<333	15	9.2				
					64-333			25	23	0.0305	0.104
					<64			45	255	0.1796	0.704
									278	0.1932	0.695
	67	5.96	a	583	<333	15	9.6				
					64-333			35	58	0.0748	0.206
					<64			41	261	0.3788	1.45
									252	0.3670	1.46
			b	660	<333	15	12				
					64-333			23	18	0.0558	0.192
					<64			45	208	0.2759	1.33
									198	0.2578	1.30
									176	0.2298	1.31

TABLE 6(a). SEDIMENT TRAP SUBSAMPLING DATA (CONTINUED) JANUARY 1983

SIDE a - CONTAINED SODIUM AZIDE
SIDE b - NO SODIUM AZIDE

STN.	DEPTH (m)	TIME (DAYS)	SIDE OF TRAP	TOTAL VOLUME (mL)	SIZE FRACTION (μm)	VOLUME FOR MICROSCOPE ANALY. (mL)	VOLUME FOR CH1a ANALY. (mL)	VOLUME FOR POC.N ANALYSIS (mL)	SUBSAMPLES FOR METAL ANALYSIS AND DRY WEIGHT DETERMINATION		
									VOL. (mL)	WEIGHT OF SEDIMENT (g)	CONC. (gL-1)
ST-3	70	5.96	a	575	<333	15	8.6				
					64-333			19.5	25	0.00999	0.031
					<64			48.5	249	0.0857	0.344
									245	0.0859	0.350
			b	535	<333	15	11.0				
					64-333			12.5	15	0.0110	0.038
					<64			60	232	0.0826	0.356
									216	0.0761	0.352
ST-3	300	5.97	a	575	<333	15	9.8				
					64-333			20	16	0.0189	0.074
					<64			45	240	0.4077	1.70
									260	0.4417	1.70
			b	545	<333	15	11.0	20	30	0.0264	0.081
					64-333			33	242	0.4330	1.79
					<64				237	0.4217	1.78

TABLE 6(a). SEDIMENT TRAP SUBSAMPLING DATA (CONTINUED) JANUARY 1983

SIDE a - CONTAINED SODIUM AZIDE
SIDE b - NO SODIUM AZIDE

STN.	DEPTH (m)	TIME (DAYS)	SIDE OF TRAP	TOTAL VOLUME (mL)	SIZE FRACTION (um)	VOLUME FOR MICROSCOPE ANALY. (mL)	VOLUME FOR CHla ANALY. (mL)	VOLUME FOR POC,N ANALYSIS (mL)	SUBSAMPLES FOR METAL ANALYSIS AND DRY WEIGHT DETERMINATION		
									VOL. (mL)	WEIGHT OF SEDIMENT (g)	CONC. (gL-1)
ST-3	353	5.97	a	570	<333	15	8.6				
					64-333			30	36	0.02543	0.082
					<64			50	250	0.5957	2.38
									242	0.5739	2.37
			b	560	<333	15	11.2				
					64-333			29.5	23.5	0.0197	0.079
					<64			44	249.5	0.5879	2.36
									238	0.5607	2.36
ST-4	30	5.97	a	540	<333	15	9.1				
					64-333			26.5	26	0.0049	0.018
					<64			55	223	0.0478	0.210
									228	0.0473	0.212
			b	470	<333	15	9.7				
					64-333			17.5	17	0.0118	0.051
					<64			45	210	0.0523	0.249
									201	0.0497	0.247

TABLE 6(a). SEDIMENT TRAP SUBSAMPLING DATA (CONTINUED) JANUARY 1983

SIDE a - CONTAINED SODIUM AZIDE
SIDE b - NO SODIUM AZIDE

STN.	DEPTH (m)	TIME (DAYS)	SIDE OF TRAP	TOTAL VOLUME (mL)	SIZE FRACTION (μm)	VOLUME FOR MICROSCOPE ANALY. (mL)	VOLUME FOR CHla ANALY. (mL)	VOLUME FOR POC.N ANALYSIS (mL)	SUBSAMPLES FOR METAL ANALYSIS AND DRY WEIGHT DETERMINATION		
									VOL. (mL)	WEIGHT OF SEDIMENT (g)	CONC. (gL-1)
ST-4	70	5.97	a	545	<333	15	11.4				
					64-333			32	32	0.0062	0.023
					<64			42	248	0.1466	0.591
									222	0.1304	0.587
			b	570	<333	15	8.8				
					64-333			23	27	0.0084	0.027
					<64			55	246	0.1452	0.590
									244	0.1433	0.587
	150	5.97	a	575	>500			30	27		
					333-500			18	18		
					<333	15	8.4				
					202-333			23	38	0.0024	0.007
					64-202			33	31	0.0086	0.031
					35-64			37.5	36	0.0176	0.062
					<35			53	251	0.2993	1.192
									252	0.3063	1.215
			b	585	>500			22	21		
					333-500			29	32		
					<333	15	10				
					202-333			29	24	0.0012	0.005
					64-202			21	21	0.0074	0.025
					35-64			49	52	0.0197	0.065
					<35			54	253	0.2753	1.088
									252	0.2774	1.101

TABLE 6(a). SEDIMENT TRAP SUBSAMPLING DATA (CONTINUED) JANUARY 1983

SIDE a - CONTAINED SODIUM AZIDE
SIDE b - NO SODIUM AZIDE

STN.	DEPTH (m)	TIME (DAYS)	SIDE OF TRAP	TOTAL VOLUME (mL)	SIZE FRACTION (μm)	VOLUME FOR MICROSCOPE ANALY. (mL)	VOLUME FOR CHla ANALY. (mL)	VOLUME FOR POC.N ANALYSIS (mL)	SUBSAMPLES FOR METAL ANALYSIS AND DRY WEIGHT DETERMINATION		
									VOL. (mL)	WEIGHT OF SEDIMENT (g)	CONC. (gL-1)
ST-4	208	5.99	a	435	<333	15	9				
					64-333			21	22	0.0216	0.097
					<64			40	186	0.6118	3.289
									186	0.6167	3.316
			b	575	<333	15	10				
					64-333			20	26.5	0.0305	0.093
					<64			48	250	0.7083	2.833
									258	0.7401	2.869

TABLE 6(b). AMOUNTS CAUGHT IN SEDIMENT TRAPS, JANUARY 1983

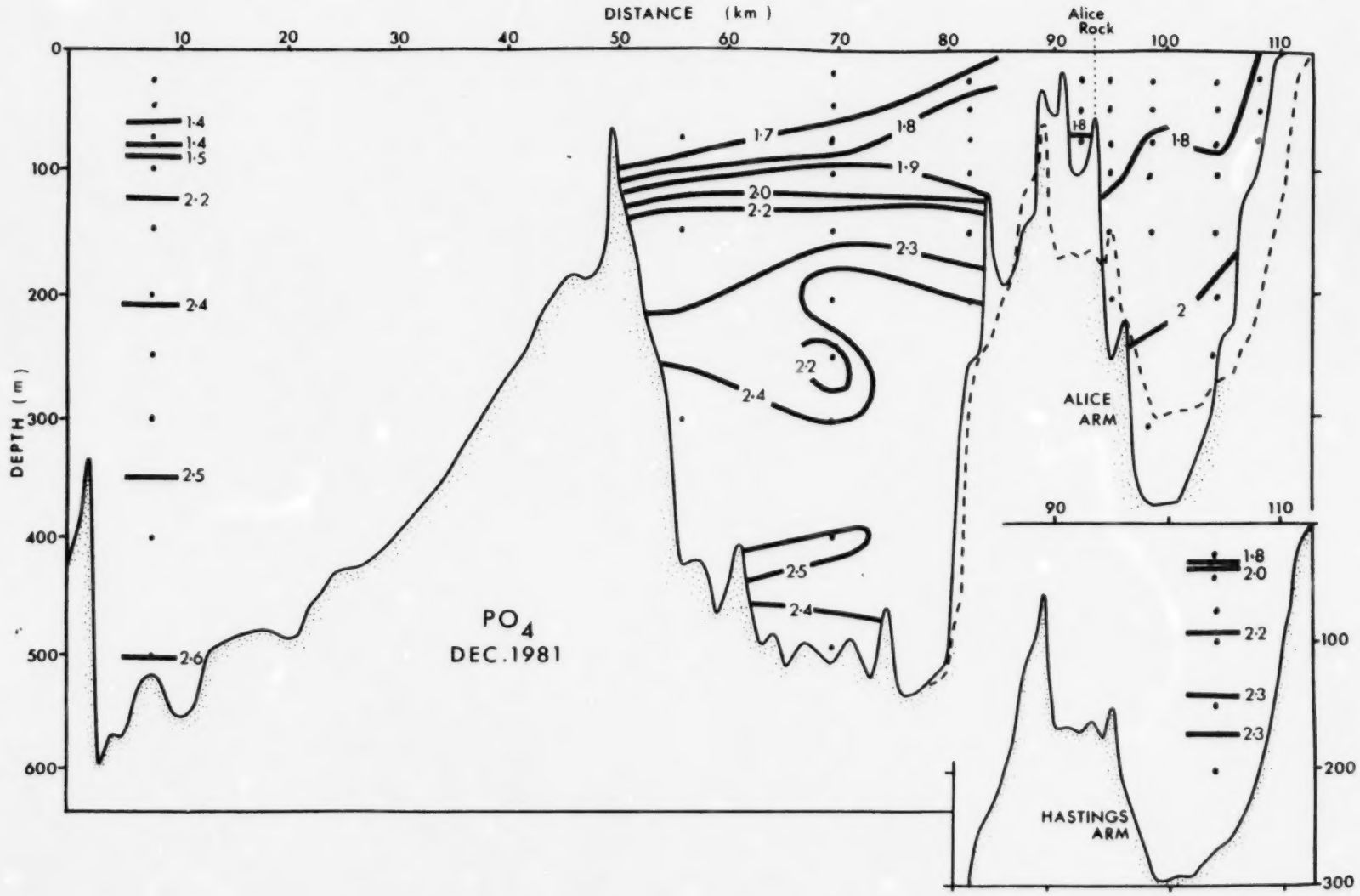
STATION	DEPTH (m)	TOTAL SEDIMENTATION $gm^{-2}day^{-1}$ DRY WEIGHT ($\bar{X}\pm s$ (n)) a) NaN_3	b) No Preservative	AVERAGE TOTAL SEDIMENTATION $gm^{-2}day^{-1}$ a and b sides $\bar{X}\pm s$	% COARSER THAN 64 µm a	b
ST-1	30	5.97 ± 0.05(2)	6.37 ± 0.05(2)	6.17 ± 0.28	10.1	12.9
	67	12.59 ± 0.06(2)	12.93 ± 0.15(2)	12.76 ± 0.24	12.4	12.8
ST-3	70	2.84 ± 0.04(2)	2.72 ± 0.02(2)	2.78 ± 0.08	8.3	13.8
	300	13.52 ± 0.00 (2)	13.21 ± 0.06(2)	13.37 ± 0.22	4.3	4.3
	353	18.19 ± 0.06(2)	17.74 ± 0.00(2)	17.97 ± 0.32	3.4	3.2
ST-4	30	1.61 ± 0.02(2)	1.83 ± 0.01(2)	1.72 ± 0.15	8.1	17.0
	70	4.32 ± 0.02(2)	4.57 ± 0.10(2)	4.45 ± 0.18	3.6	4.6
	150	9.74 ± 0.14(2)	9.04 ± 0.08(2)	9.39 ± 0.49	2.9	2.6
	208	19.15 ± 0.12(2)	21.91 ± 0.20(2)	20.5 ± 2.0	2.8	3.1

TABLE 6(c). PERCENT MATERIAL IN THE VARIOUS SIZE FRACTIONS FOR TRAPS a AND b AT STATION 4, 150m

SIZE RANGE μm	% MATERIAL a	b
202-333	0.53	0.43
64-202	2.40	2.16
35-64	4.80	5.46
<35	92.3	92.0

Appendix 2.

Longitudinal sections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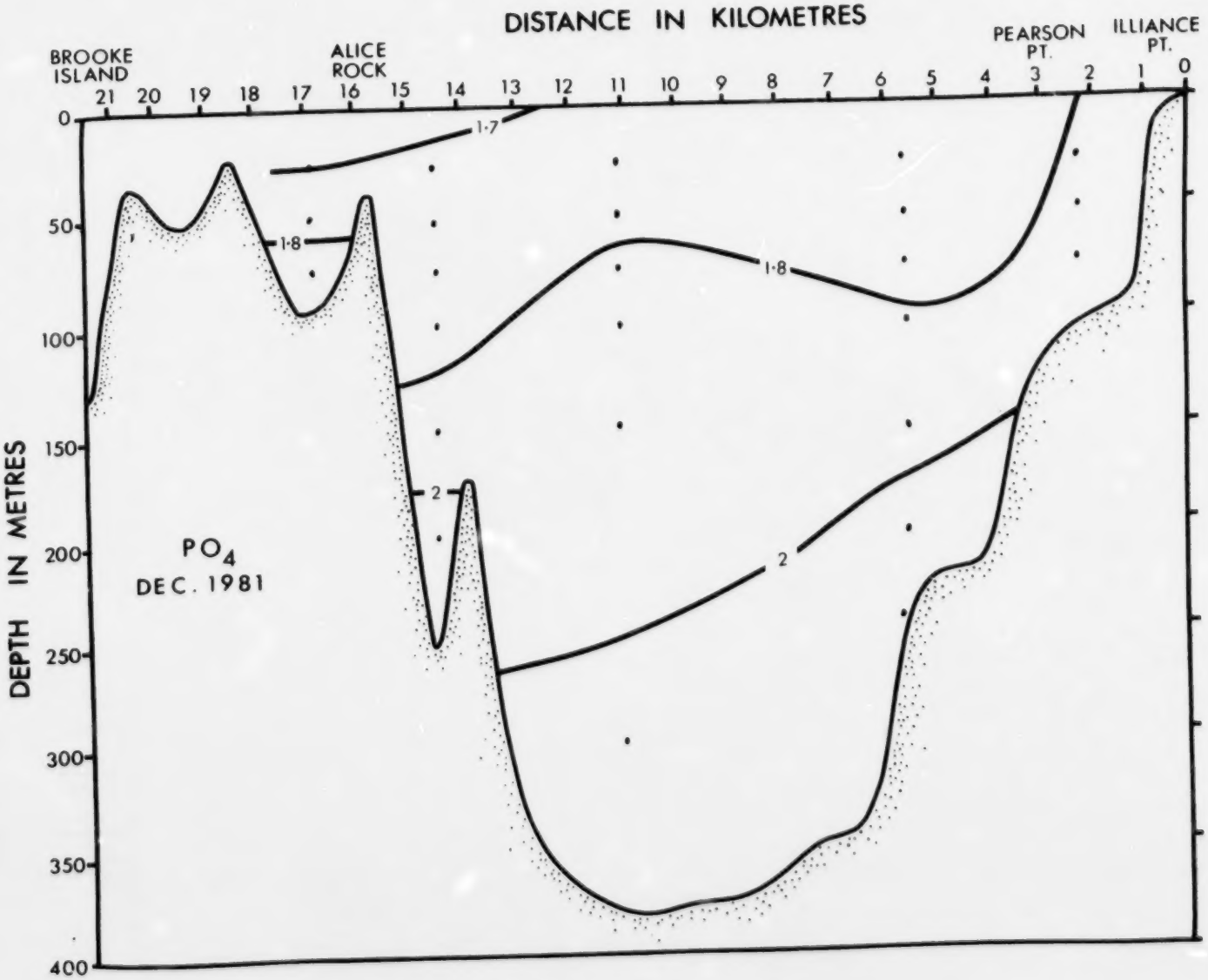
Alice Rock
DEPTH (m)
PO4
DEC.1981
ALICE ARM
HASTINGS ARM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BROOKE ISLAND
ALICE ROCK
PEARSON PT.
ILLIANCE PT.
21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
DEPTH IN METRES
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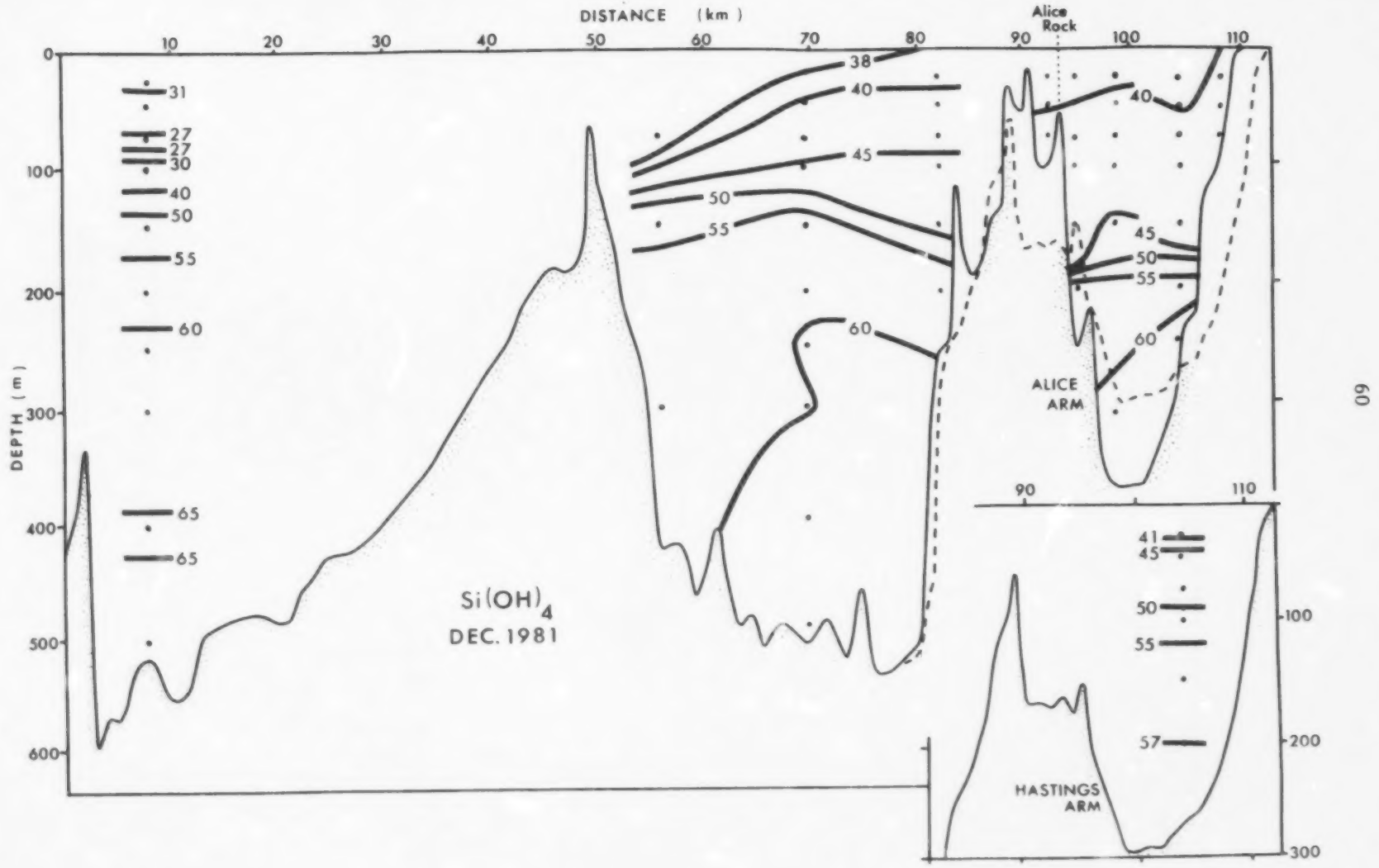
1·7
1·8
1·8
2
2
PO4
DEC. 1981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DEPTH (m)
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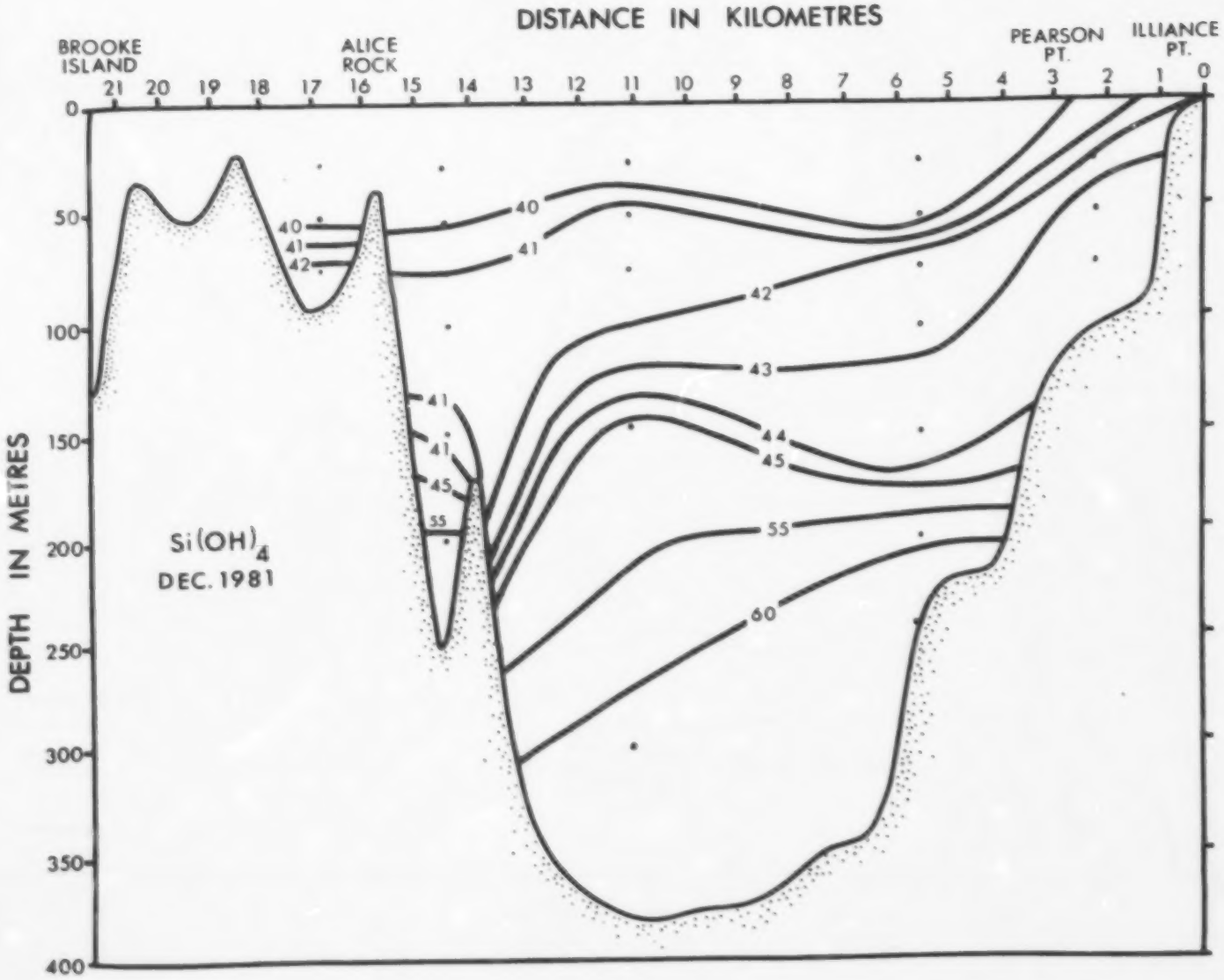
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PEARSON PT.
ILLIANCE PT.
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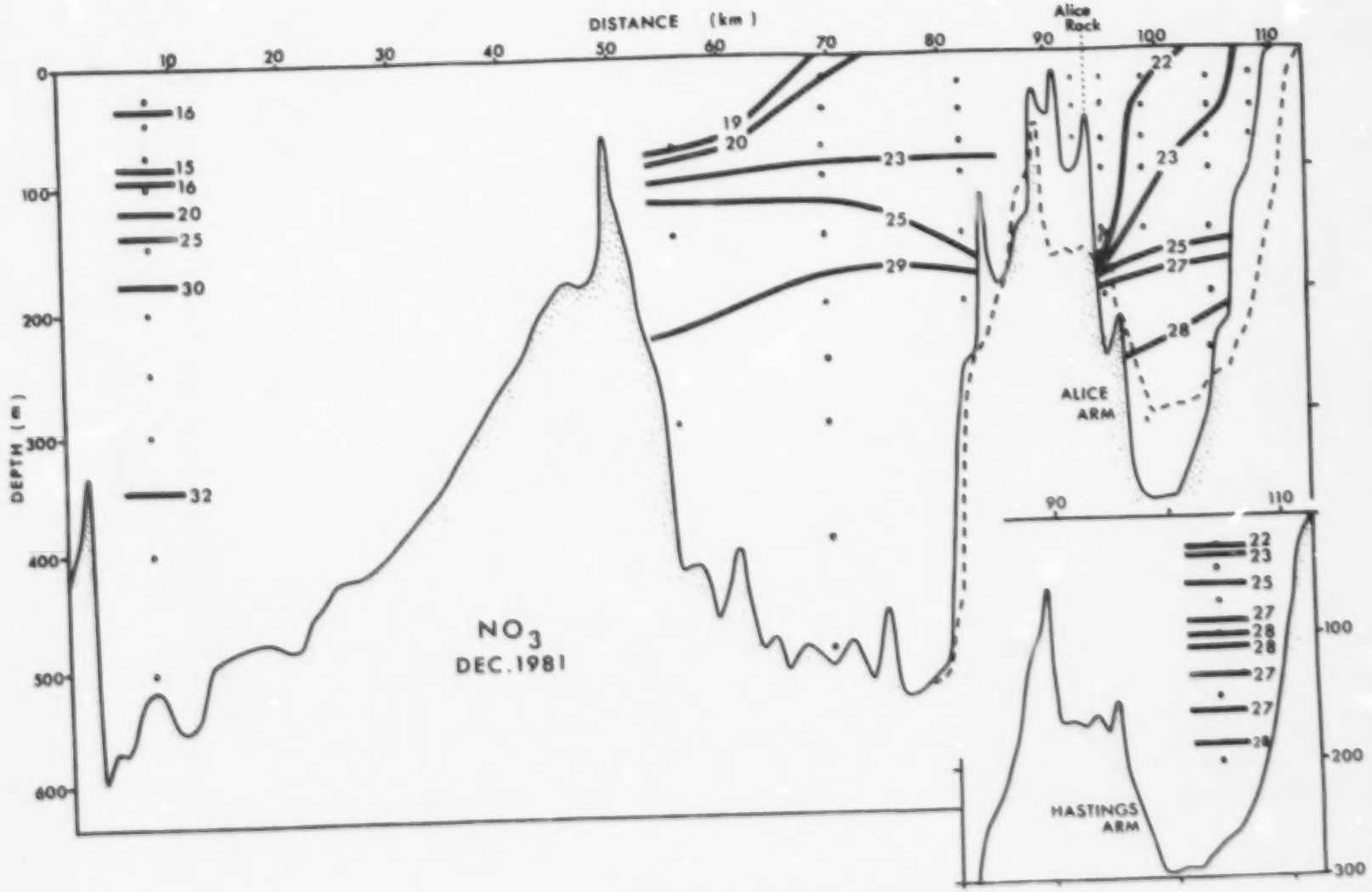
40 41 42 43 44 45 55 60
Si(OH)4
DEC. 1981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DEPTH (m)
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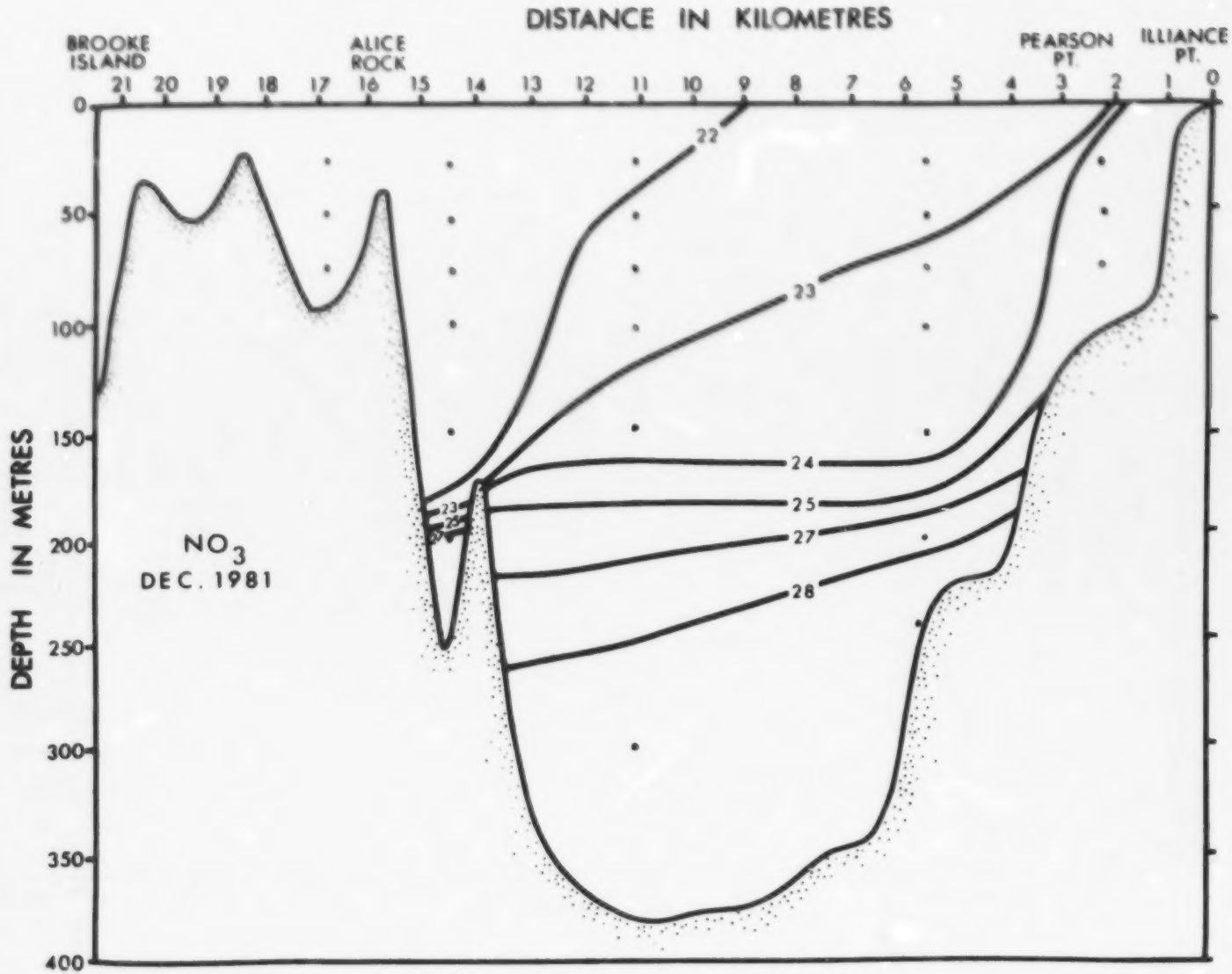
ALICE ARM
HASTINGS ARM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ALICE ROCK
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ILLIANCE PT.
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DEPTH IN METRES
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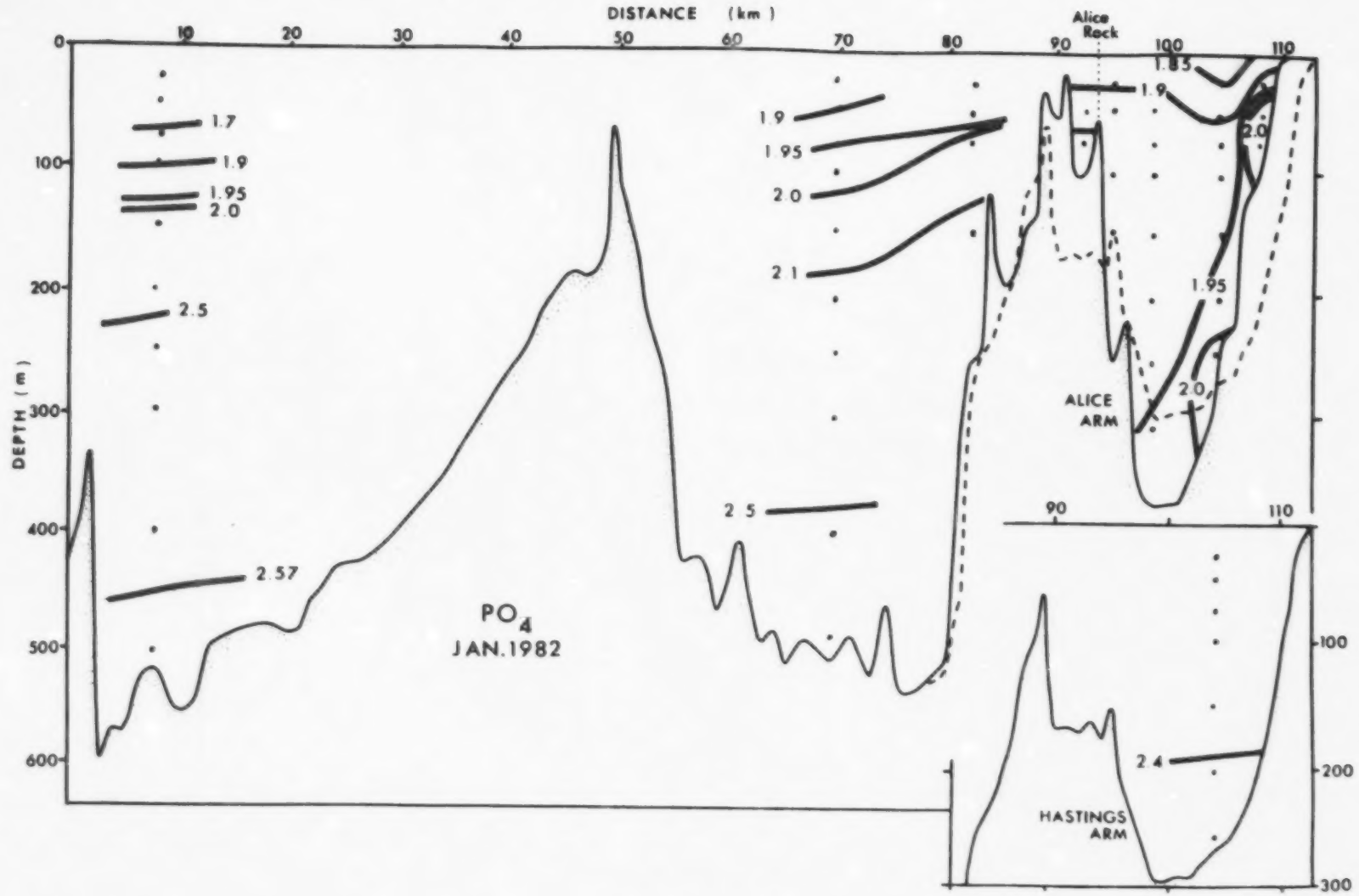
22
23
24
25
27
28
NO3
DEC. 1981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20
30
40
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70
80
90
100
110
Alice Rock
DEPTH (m)
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400
500
600
1.7
1.9
1.95
2.0
2.5
2.57
1.9
1.95
2.0
2.1
2.5
PO4
JAN.1982
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1.9
2.0
1.95
2.0
ALICE ARM
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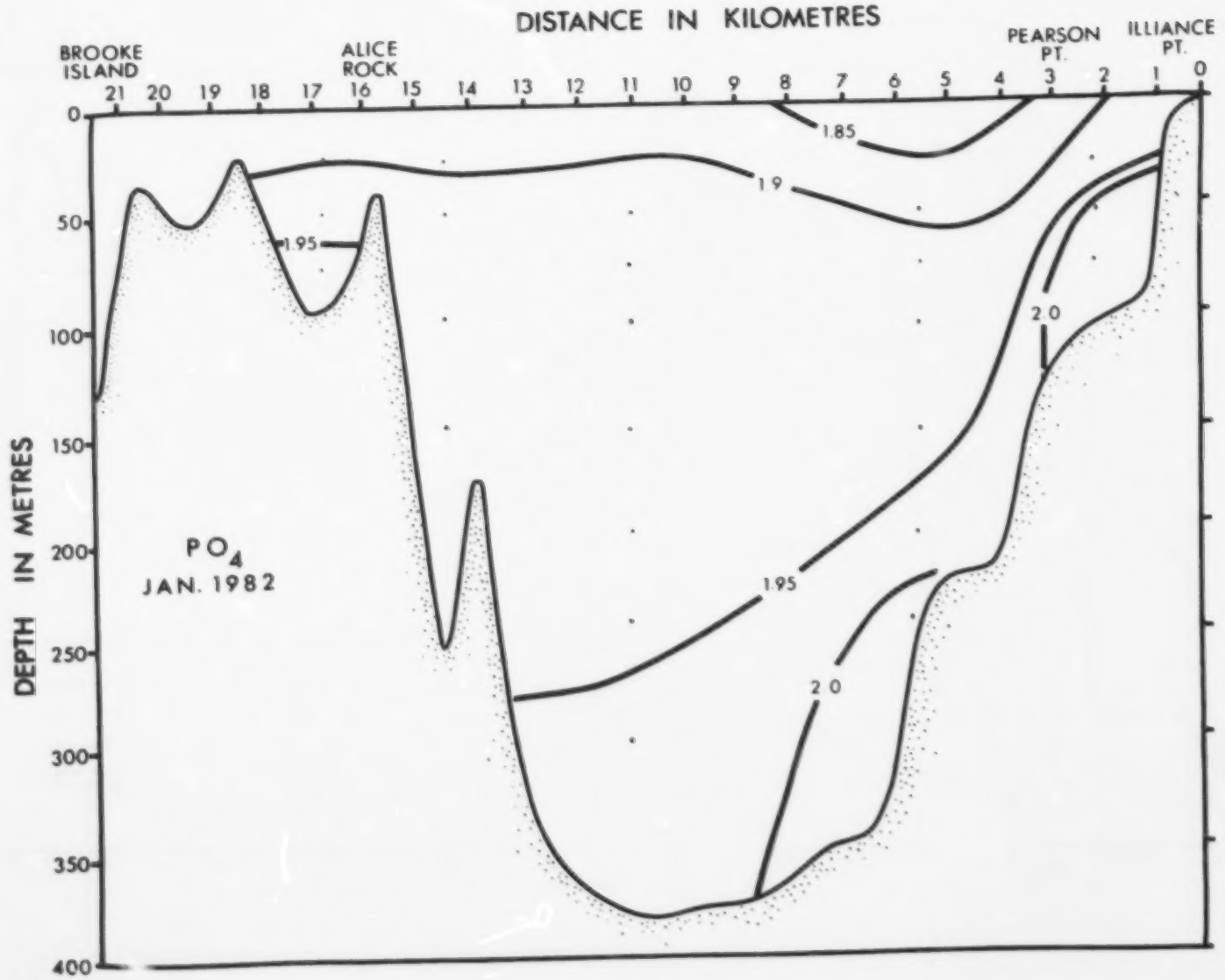
110
100
200
300
2.4
HASTINGS ARM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BROOKE ISLAND
ALICE ROCK
PEARSON PT.
ILLIANCE PT.
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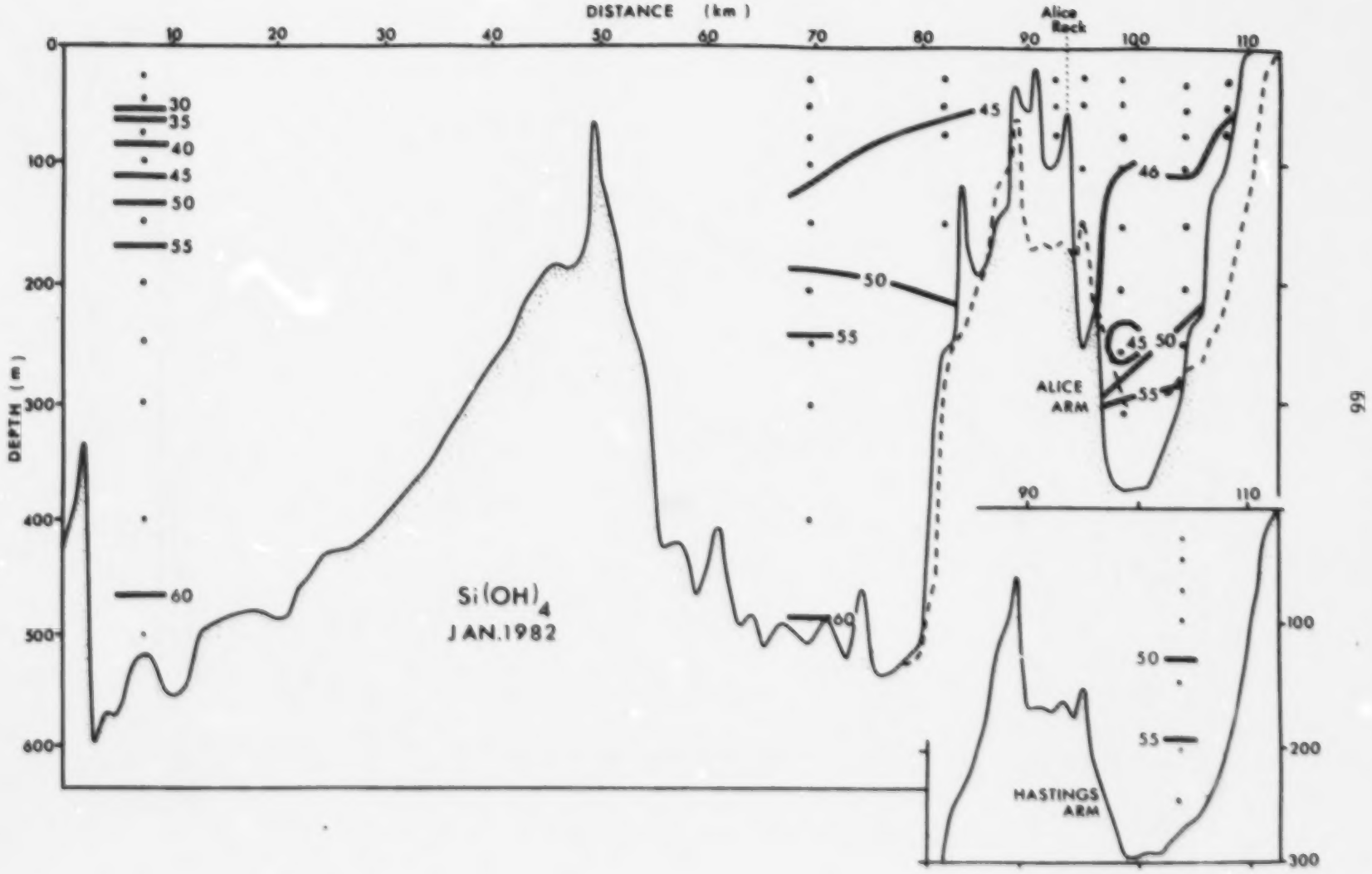
DEPTH IN METRES
0
50
100
150
200
250
300
350
400
1.85
1.9
1.95
2.0
1.95
2.0
PO4
JAN. 1982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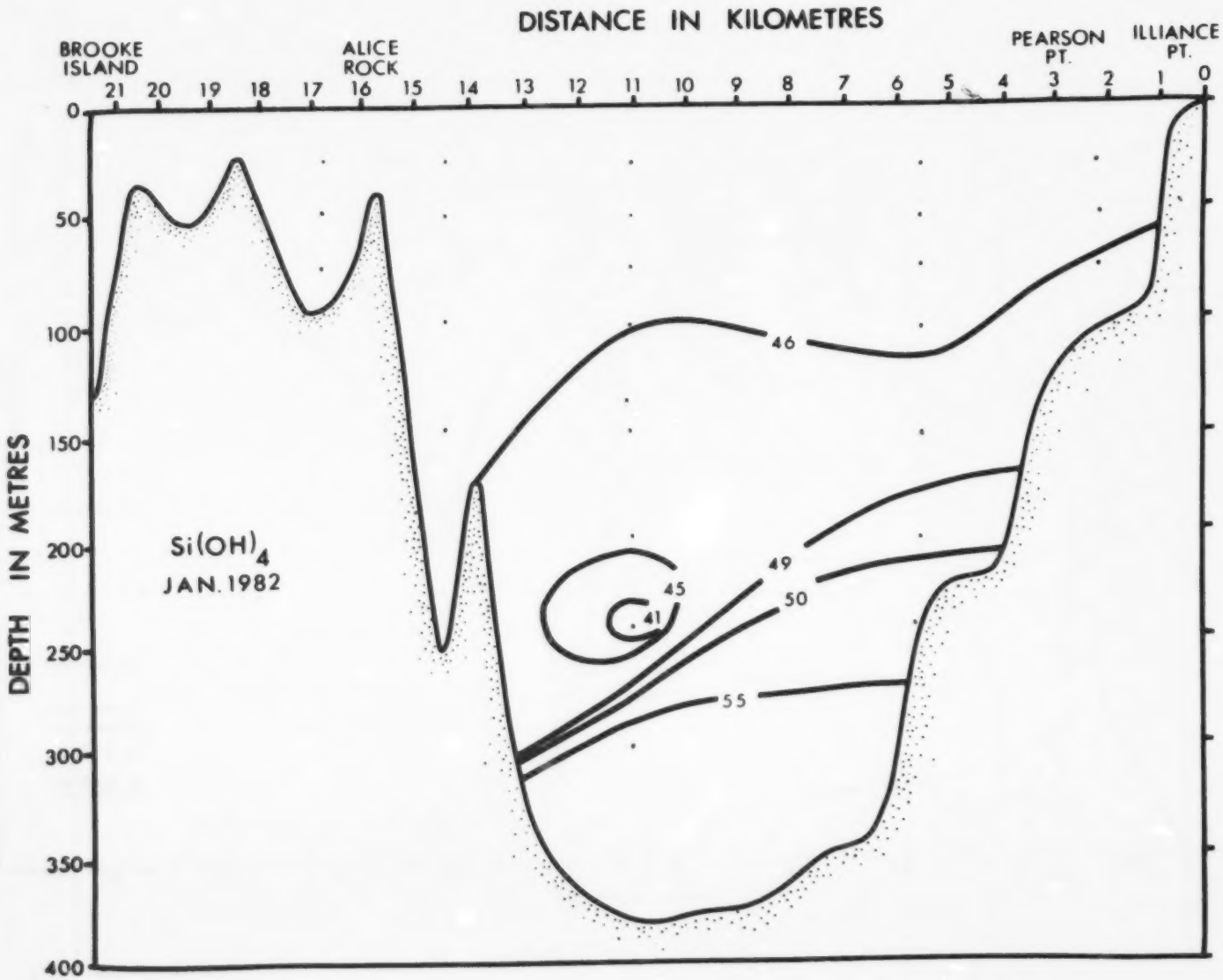
DEPTH (m)
Si(OH)4
JAN.1982
ALICE ARM
HASTINGS ARM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BROOKE ISLAND
ALICE ROCK
PEARSON PT.
ILLIANCE PT.
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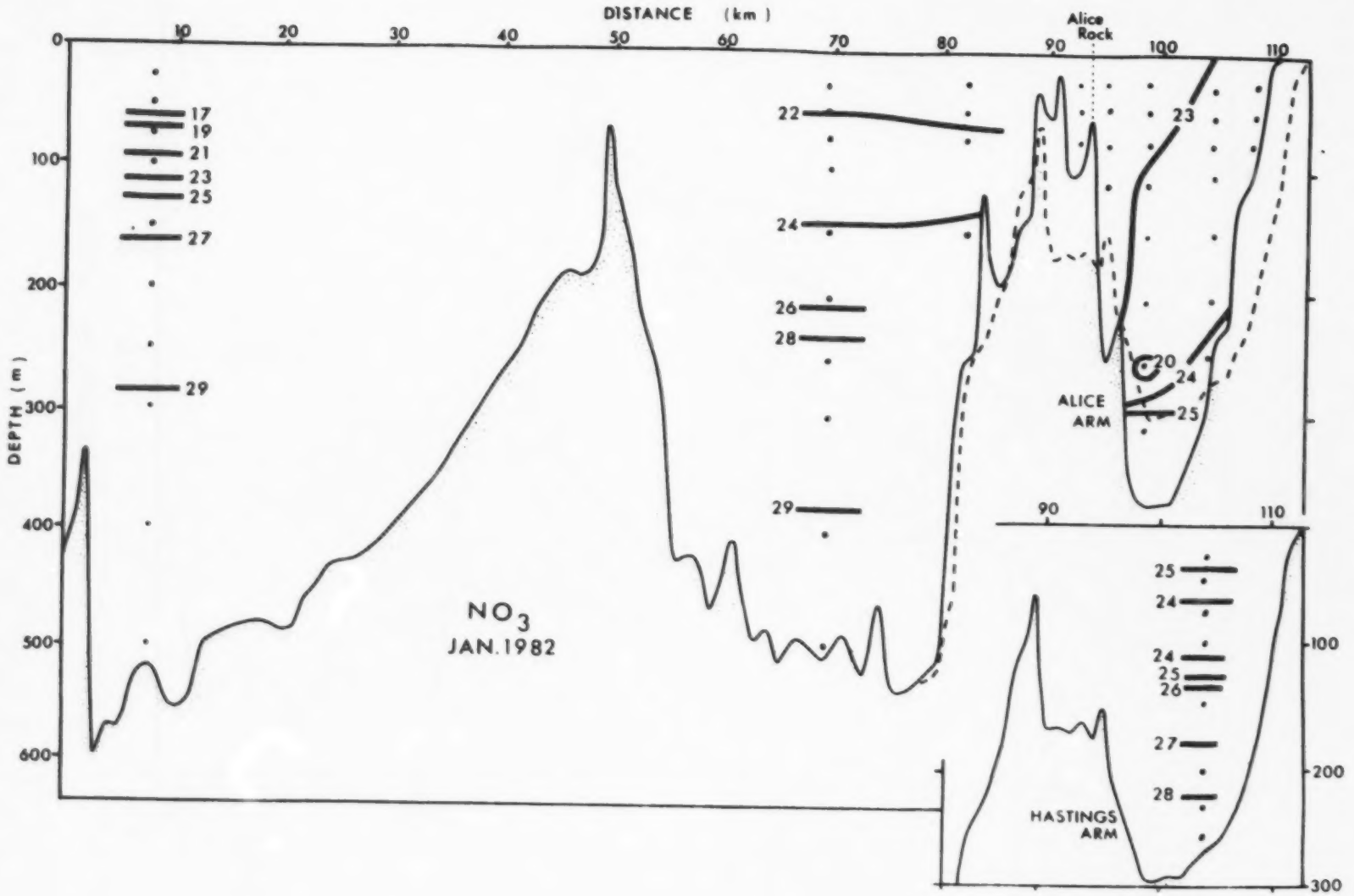
Si(OH)4
JAN. 1982
46
49
45
41
50
55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30
40
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90
100
110
Alice Rock
DEPTH (m)
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200
300
400
500
600
17
19
21
23
25
27
29
22
24
26
28
29
23
20
24
ALICE ARM
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25
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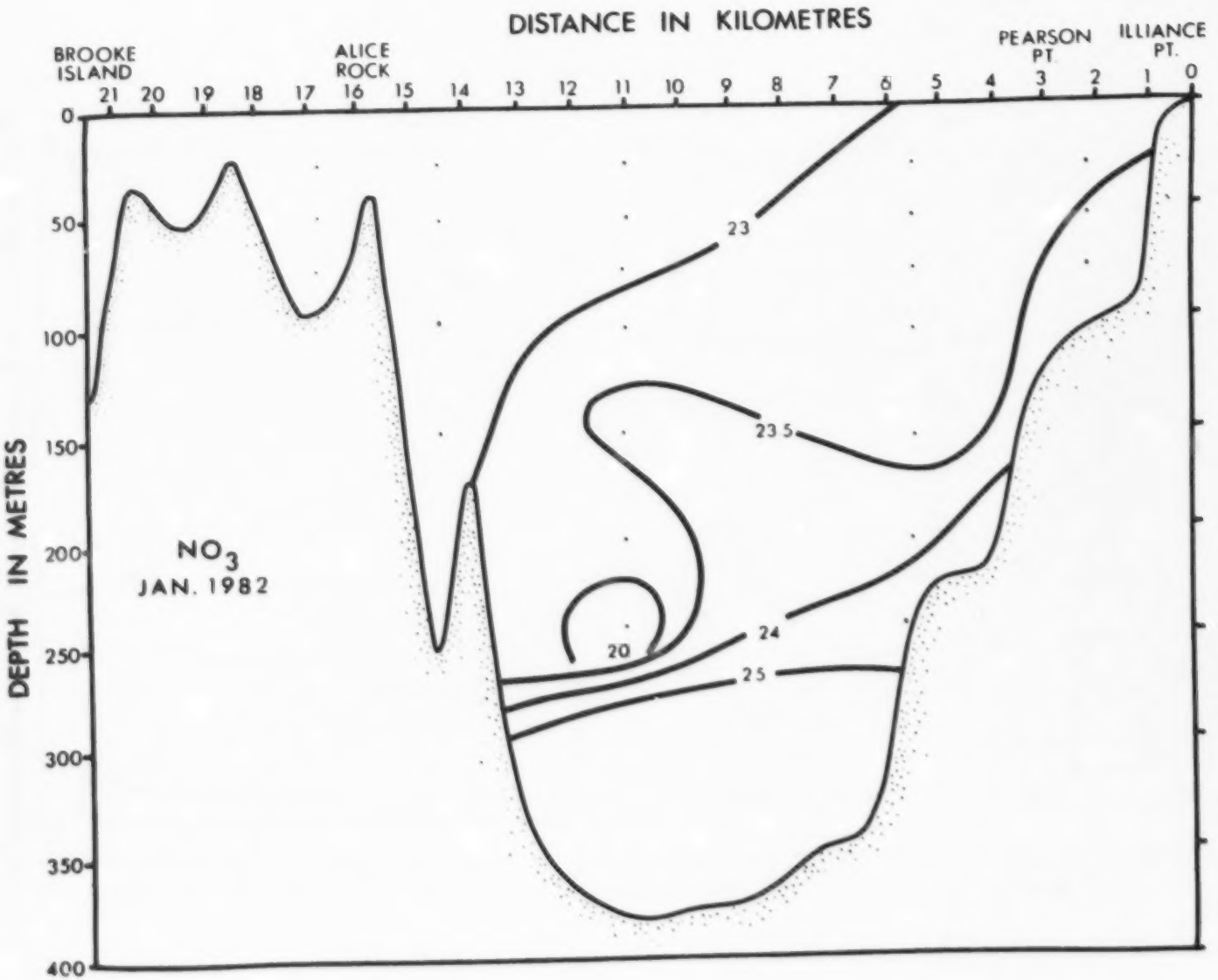
26
27
28
100
200
300
HASTINGS ARM
NO3
JAN. 1982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PEARSON PT
ILLIANCE PT.
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150
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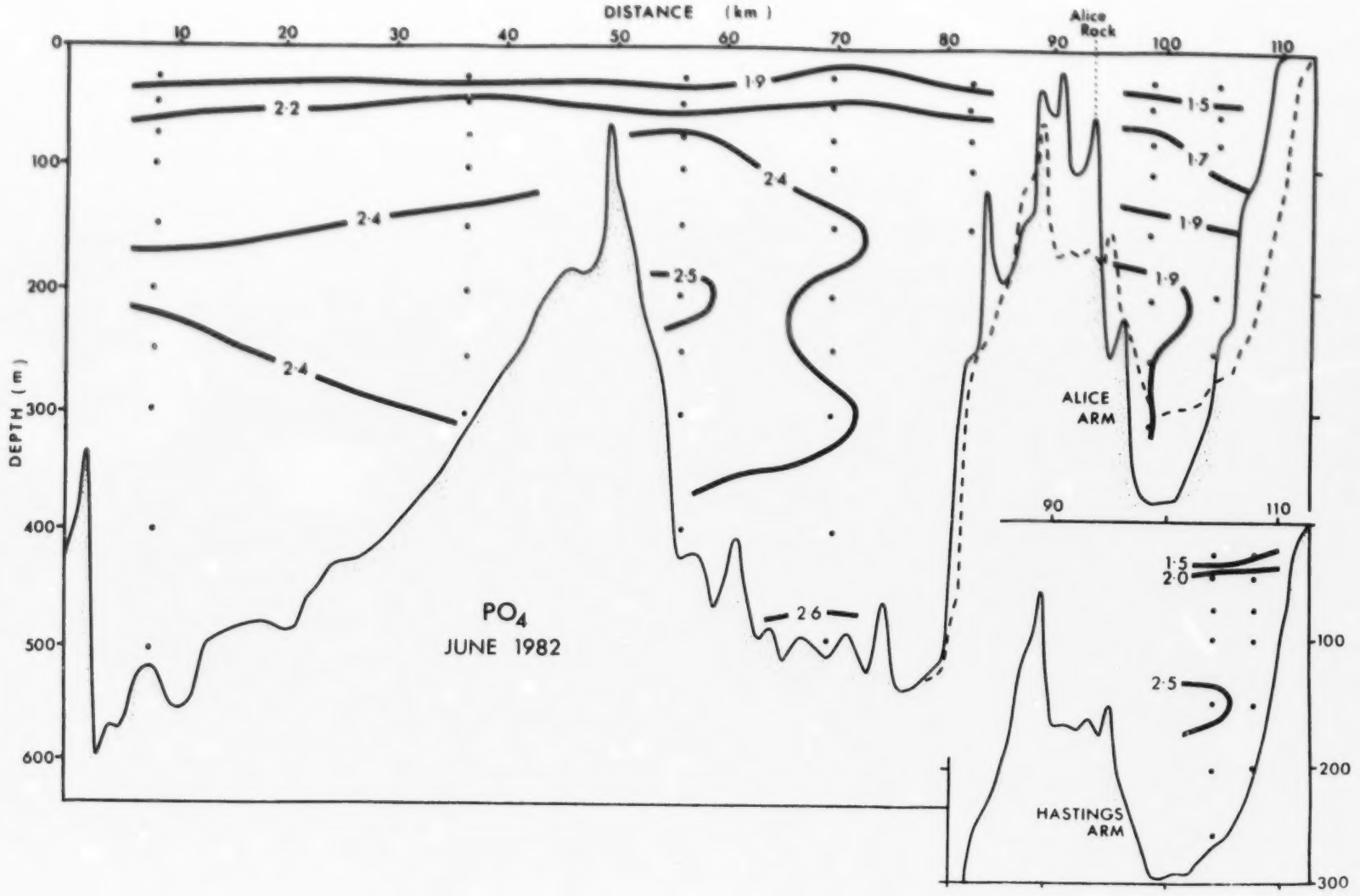
350
400
NO3
JAN. 1982
23
23 5
24
25
20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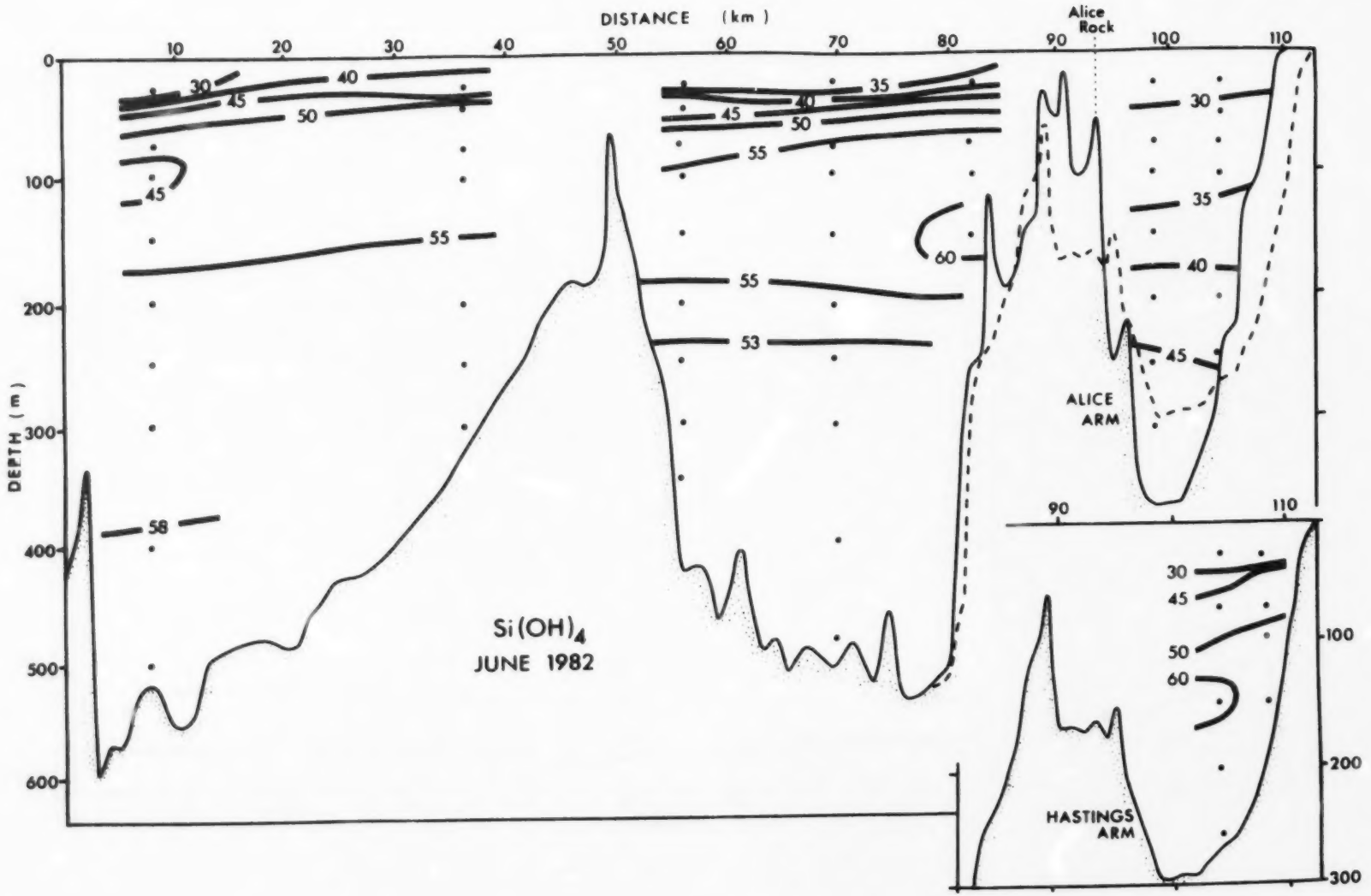
0
10
20
30
40
50
60
70
80
90
100
110
Alice Rock
DEPTH (m)
100
200
300
400
500
600
1·9
2·2
2·4
2·4
2·4
2·5
2·6
PO4
JUNE 1982
1·5
1·7
1·9
1·9
ALICE ARM
90
110
1·5
2·0
2·5
100
200
300
HASTINGS ARM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DEPTH (m)
Si(OH)4
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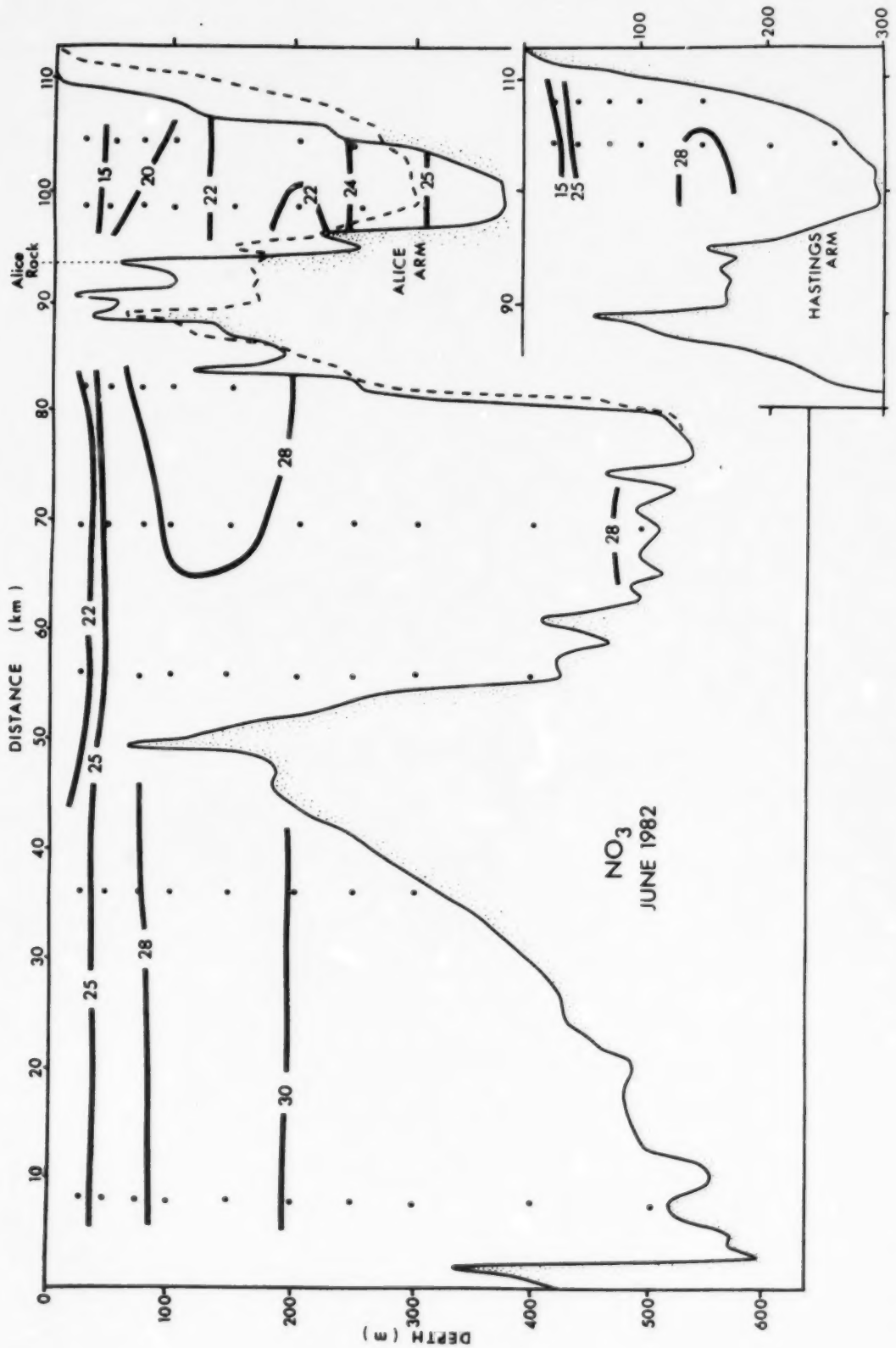
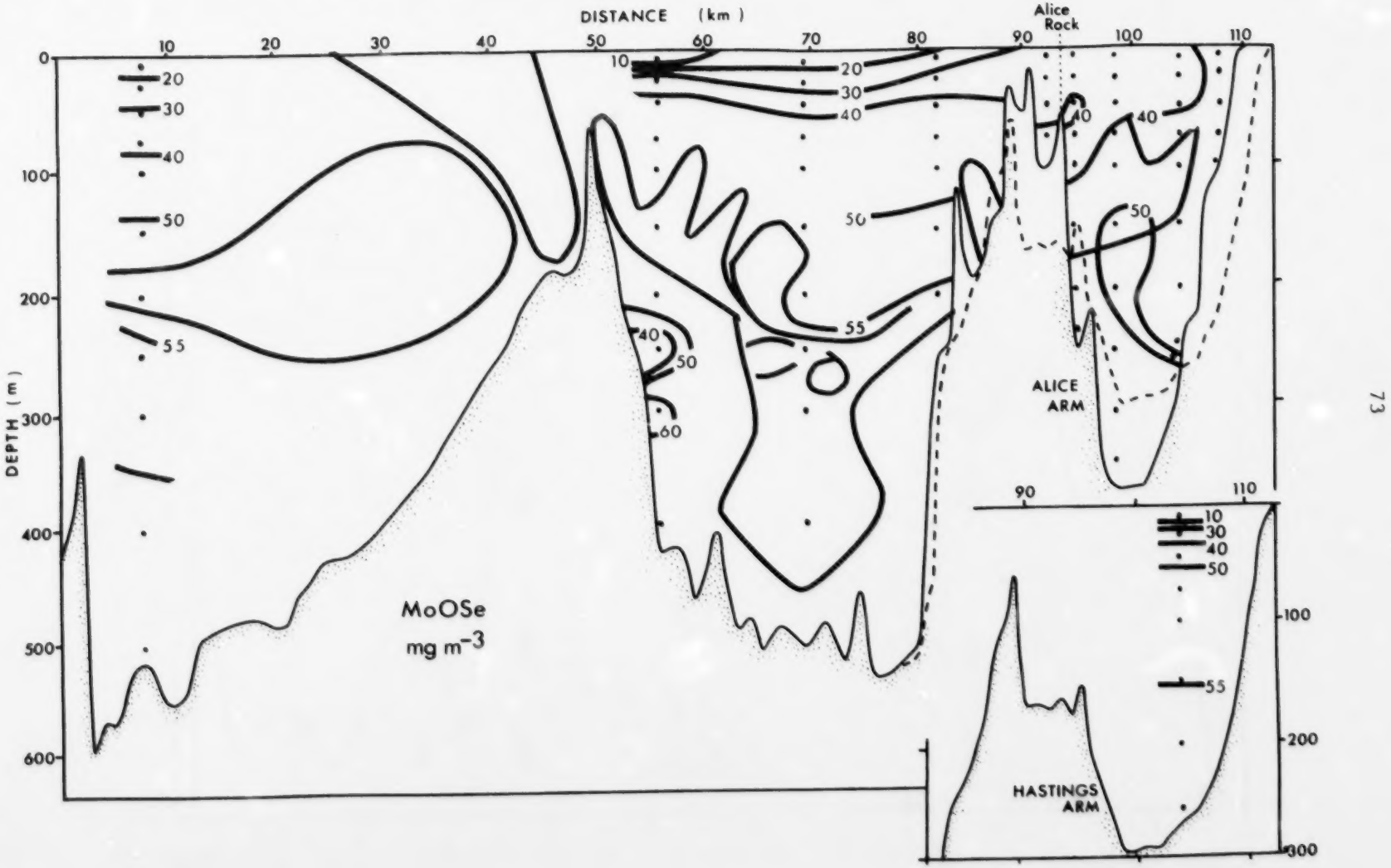
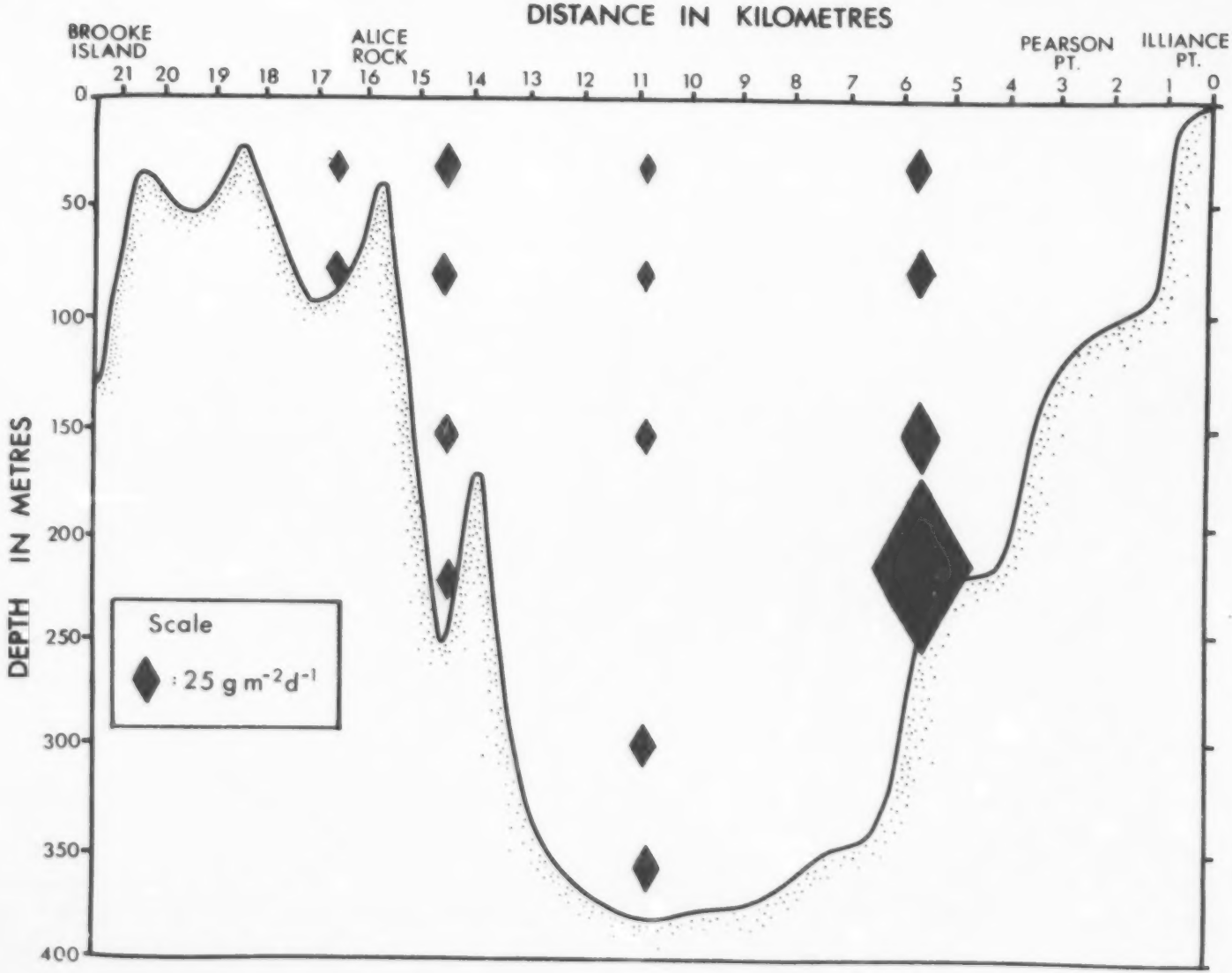
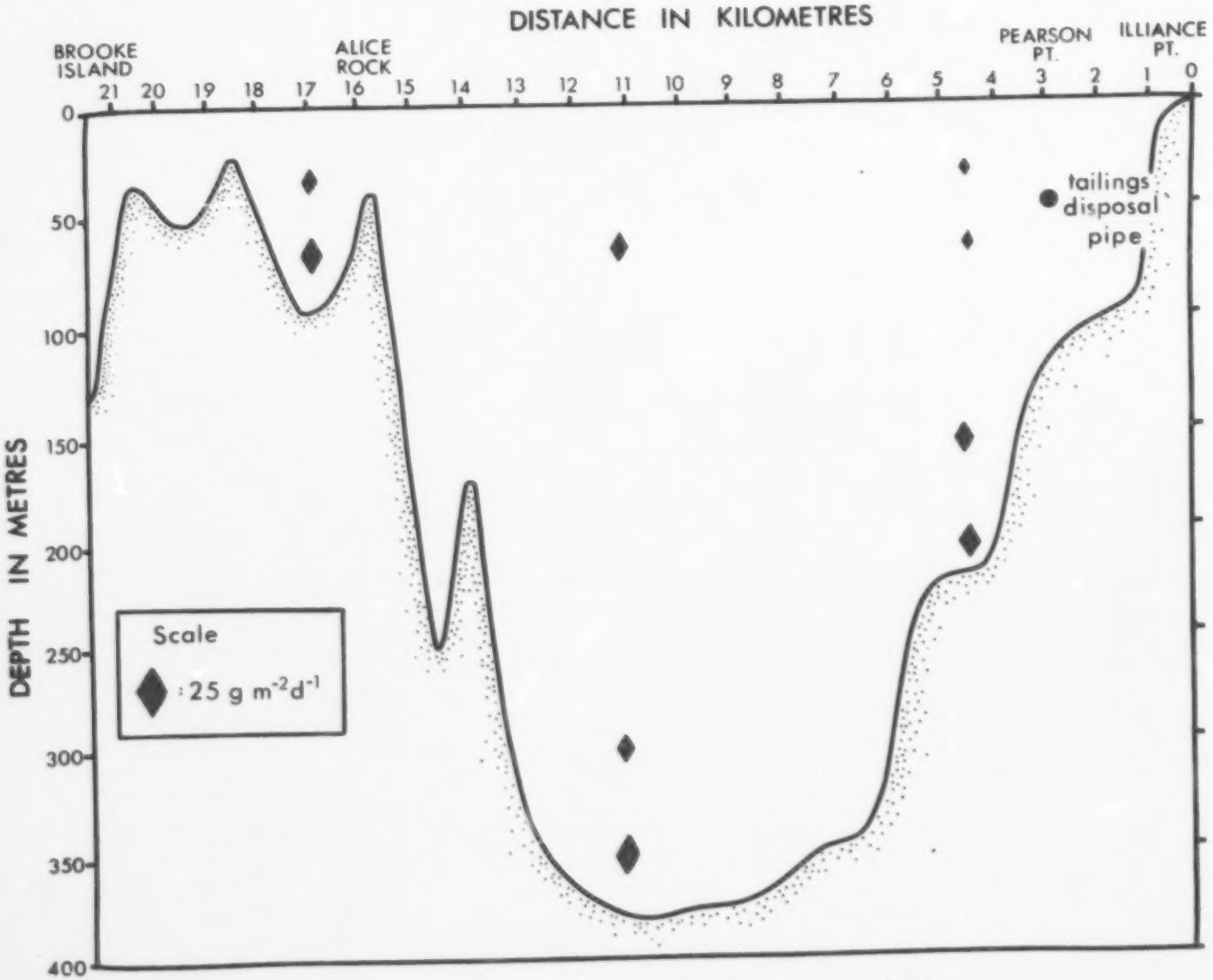
ALICE ARM
HASTINGS ARM


DISTANCE (km)
DEPTH (m)
Alice Rock
ALICE ARM
HASTINGS ARM
NO3
JUNE 1982
15
20
22
24
25
28
30


DISTANCE (km)
Alice Rock
DEPTH (m)
MoOSe
mg m-3
ALICE ARM
HASTINGS ARM



SEDIMENTATION in ALICE ARM JUN. '82



SEDIMENTATION in ALICE ARM JAN. '83

Number/
Numéro

2

Ocean Chemistry Data Report: Alice Arm, Observatory Inlet; Part 2, March 1982

R.W. Macdonald, M.C. O'Brien, D.M. Macdonald

Institute of Ocean Sciences
Department of Fisheries and Oceans
Sidney, B.C. V8L 4B2

1984

Canadian Data Report of Hydrography and Ocean Sciences No. 17 (Part 2)

Canadian Data Report Of Hydrography and Ocean Sciences

These reports provide a medium for the documentation and dissemination of data in a form directly useable by the scientific and engineering communities.

Generally, the reports will contain raw and/or analyzed data but will not contain interpretations of the data. Such compilations will commonly have been prepared in support of work related to the programs and interests of the Ocean Science and Surveys (OSS) sector of the Department of Fisheries and Oceans.

Data Reports are produced regionally but are numbered and indexed nationally. Requests for individual reports will be fulfilled by the issuing establishment listed on the front cover and title page. Out of stock reports will be supplied for a fee by commercial agents.

Regional and headquarters establishments of Ocean Science and Surveys ceased publication of their various report series as of December 1981. A complete listing of these publications and the last number issued under each title are published in the *Canadian Journal of Fisheries and Aquatic Sciences*, Volume 38: Index to Publications 1981. The current series began with Report Number 1 in January 1982.

Rapport statistique canadien sur l'hydrographie et les sciences océaniques

Ces rapports servent de véhicule pour la compilation et la diffusion des données sous une forme directement utilisable par les scientifiques et les techniciens.

En général, les rapports contiennent des données brutes ou analysées mais ne fournissent pas d'interprétations des données. Ces compilations sont préparées le plus souvent à l'appui de travaux reliés aux programmes et intérêts du service des Sciences et Levés océaniques (SLO) du ministère des Pêches et des Océans.

Les rapports statistiques sont produits à l'échelon régional mais sont numérotés et placés dans l'index à l'échelon national. Les demandes de rapports seront satisfaites par l'établissement auteur dont le nom figure sur la couverture et la page de titre. Les rapports épuisés seront fournis contre rétribution par des agents commerciaux.

Les établissements des Sciences et Levés océaniques dans les régions et à l'administration centrale ont cessé de publier leurs diverses séries de rapports depuis décembre 1981. Vous trouverez dans l'index des publications du volume 38 du *Journal canadien des sciences halieutiques et aquatiques*, la liste de ces publications ainsi que le dernier numéro paru dans chaque catégorie. La nouvelle série a commencé avec la publication du Rapport n° 1 en janvier 1982.

Canadian Data Report of Hydrography and Ocean Sciences No. 17 (Part 2)

1984

OCEAN CHEMISTRY DATA REPORT : ALICE ARM, OBSERVATORY INLET; PART 2, MARCH 1982

by

R.W. Macdonald

M.C. O'Brien

D.M. Macdonald

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Department of Fisheries and Oceans
Sidney, B.C. V8L 4B2

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ABSTRACT

Macdonald, R.W., M.C. O'Brien, D.M. Macdonald 1984. Ocean Chemistry Data Report: Alice Arm, Observatory Inlet; Part 2 March 1982. Can. Data Rep. Hydrogr. Ocean Sci. 17 (Part 2), 52pp.

The preliminary data from an Ocean Chemistry Cruise (OC-82-IS-001), to Alice Arm, B.C., are reported here (March 1982). Included are measurements of salinity, temperature, chlorophyll a, silicate, nitrate, phosphate, particulates (dry weight and Coulter Counter) and amounts of material caught in sediment traps.

Key words: Alice Arm, Data, Oceanographic.

RESUME

Macdonald, R.W., M.C. O'Brien, D.M. Macdonald 1984. Ocean Chemistry Data Report: Alice Arm, Observatory Inlet; Part 2 March 1982. Can. Data Rep. Hydrogr. Ocean Sci. 17 (Part 2), 52pp.

Les données préliminaires obtenues lors d'une expédition (Chimie de l'océan) (OC-82-IS-001) au bras Alice (C.-B.) sont présentées (mars 1982). Celles-ci comprennent des mesures de salinité et de température et des dosages de chlorophylle a, silicate, nitrate, phosphate, matières particulaires (poids sec et numération Coulter) et de matériaux recueillis dans des pièges à sédiments.

Mots clés: Bras Alice, données, océanographie

ACKNOWLEDGEMENTS

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INTRODUCTION

As part of an investigation of the transport and fate of mine tailings disposed in a coastal fjord, Ocean Chemistry conducted two cruises to Alice Arm, Hastings Arm and Observatory Inlet. During these cruises the water column and sediments were sampled, and sediment traps were deployed and recovered in Alice Arm. During another two cruises organized by Coastal Zone Oceanography, we deployed and recovered sediment traps in Alice Arm. Additionally we collected nutrient samples during two other Coastal Zone Oceanography cruises. The background and preliminary data from these cruises are reported in three Parts as follows:

Part 1. December 1981, CZO Alice Arm Cruise 02 (nutrients)
January 1982, CZO Alice Arm Cruise 03 (nutrients)
June 1982, CZO Alice Arm Cruise 05 (nutrients, sediment traps)
January 1983, CZO Alice Arm Cruise 08 (sediment traps)

Part 2. March 1982, Ocean Chemistry Cruise OC-82-IS-001
(nutrients, particulates, trace metals, sediment traps)

Part 3. September-October 1982, Ocean Chemistry Cruise OC-82-IS-003
(nutrients, particulates, trace metals, sediment traps)

Reported here in Part 2 are the sampling methods and preliminary data from the March 1982 cruise. We do not report the results of all determinations which have been or will be performed on the material caught in sediment traps or from coring. Rather this data report is intended to be a source document for the interpretation of the more specialized data as they become available. To that end we include detailed information on sampling locations and times, sampling technique and analytical methods for the data reported here. Furthermore we list the results of such water column measurements as salinity, temperature, dissolved oxygen, nutrients (reactive silicate, orthophosphate and nitrate plus nitrite), particulate concentrations and size distribution, and the mass of material collected by the sediment traps.

SAMPLING STATIONS

We have used the same sampling stations and terminology as used by Coastal Zone Oceanography. To avoid conflict, we placed our sediment traps near, but not exactly at, four of the regular stations in Alice Arm; ST-1 (AA-1), ST-2 (AA-2), ST-3 (AA-3), ST-4 (AA-4). Station locations are shown in Figure 1 with exact coordinates listed in the tables. The arrangement of sediment traps in longitudinal section is shown in Figure 2.

SAMPLING METHODS

Sea Water

Samples were collected in 10L Go-Flo bottles. These were cleaned with 1% HNO_3 for 7-18 hours, filled with 0.05% HNO_3 and distilled Milli-Q water for approximately 6 days. This was repeated once or twice. Bottles were lowered on a stainless steel hydrowire. Once the bottles had been tripped and were retrieved, subsampling took place as follows:

1. Oxygen samples were drawn first into 125 mL calibrated oxygen bottles which were pickled immediately (Ocean Chemistry Methods, 1976).

2. The contents of the Go-Flo were mixed by gentle shaking. Using plastic gloves, two small aliquots were drawn into an acid cleaned 5 L carboy to rinse it. With the aid of a large acid cleaned polyethylene funnel, approximately 4 L of water was drained quickly from the bottom of the Go-Flo bottle by rotating the bottom ball-valve to a partially open position. The contents of the 5 L carboy were later subsampled in the ship's lab for particulate determination by filtration, Coulter counter, chlorophyll *a* and microscopic examination as described below.

3. Salinity samples were drawn into 260 mL glass bottles, and nutrient samples were drawn into 2 glass and 2 plastic screw-cap test tubes (∿15 mL) after 3 rinses. Nutrient samples were immediately transferred to a chest freezer where they were frozen in an upright position and later transferred to zip-lok bags which were stored inside a dark green plastic bag.

4. The remaining sample (∿5 L) was subsampled for dissolved and/or total trace metal analysis. Sampling and results are reported elsewhere.

5. Temperature was measured with paired reversing thermometers read twice to the nearest 0.01C°.

Subsampling of 5 L Carboy

Particulates

The 4 L water sample was gently shaken before any samples were removed. After two small rinses, water was quickly transferred to acid cleaned 1 L polybottles. The polybottles were marked on the exterior with volume graduations, and as much sample as possible was filtered depending on particulate loading (2-4 L). Filtrations were carried out in an enclosure made of plastic sheeting, and with the technician wearing a hair cap, lab coat and plastic gloves. The volume filtered was recorded to the nearest 10 mL. The filters were 0.4 μm, 47 mm nuclepore filters, acid cleaned (6N HCl overnight, 1% HNO_3 overnight and rinsed in Milli-Q water) and dried at 40° overnight and weighed. After the filtered water had passed through

the filter, it was rinsed with three 10 mL portions of pH8 Milli-Q water followed by three small rinses around the filter perimeter after the castle had been removed. Blanks were prepared by periodically placing a second filter underneath. All filters were stored in acid cleaned petri-slides in a freezer and returned to the lab.

Coulter Counter

After two gentle rinses, about 250 mL of water were subsampled into a 300 mL glass salinity bottle with a teflon lined top. The same bottles were used again at the next station, and care was taken not to introduce bubbles into the water during mixing of subsampling.

Chlorophyll a (Top 100 m of the water column)

A 300 mL subsample was filtered onto a 2.5 cm GF/C filter, sprayed with a suspension of 1% $MgCO_3$, folded into a Whatman #1 quantitative filter, labelled and stored in a freezer inside a brown glass bottle containing silica-gel. The filters were returned to the lab for analysis.

Microscopic Examination

A 100-200 mL subsample was filtered onto a millipore filter with grid markings, frozen, and returned to the lab.

Sediments

A Smith-MacIntyre grab sampler (0.1 m^2 bite) was used to obtain surface sediment. Samples were removed from the surface layer and placed into Whirl-Pak bags, frozen and returned to the lab for Pb-210 determination.

Sediment Traps

The design and characteristics, and method of deployment are fully described in Part 1. Here we note only the aspects which are pertinent to this cruise.

As before, the sediment traps were placed in paired configuration. For this cruise, one of the paired traps was poisoned with formaldehyde by adding approximately 500 mL of 1% buffered formalin in 5% NaCl solution to the sample cup just before deployment. Furthermore, a polyethylene tube (30 cm long, 1 cm diameter, sealed at one end) was filled with a solution containing 37% formalin and 20 g/100 mL NaCl with rhodamine B dye. Density contrast would result in this solution slowly leaking into the sample cup after deployment. About 500 mL of 5% NaCl solution was placed in the other trap. The dye was used to investigate whether or not the traps flushed during deployment.

Subsampling of Sediment Traps

Subsampling was carried out as described in Part 1 except that all trap contents were initially passed through a 500 μm acid washed screen. The polybottles containing the sieved material were stored in a cooler (4°C) and in the dark for five days until they were returned to the laboratory. The greater than 500 μm fraction was backwashed off the screen onto a nuclepore filter, rinsed with Milli-Q water and stored frozen (-10°C) for microscopic examination.

Laboratory Subsampling of Sediment Trap Materials

The less than 500 μm fraction in the polybottle was subjected to a sampling scheme similar to that outlined in Part 1 (Route B). Details will be given here only where the process differed in a significant manner. Total volume in the polybottle was measured. Keeping the particulate matter in suspension by gentle agitation, a subsample was removed for POC, PON (∿30 mL), microscopic examination (0.4-3.5 mL), and chlorophyll a (∿10 mL). The remaining sample was subdivided into 2-5 portions (250 mL acid cleaned polyethylene graduated cylinders) and vacuum filtered onto acid washed nuclepore filters. These were rinsed (3 x 10 mL portions pH 8 Milli-Q water) and stored frozen. No further sieving steps were carried out on the material.

ANALYTICAL METHODS

We include here details of methods, and estimates of precision and accuracy pertinent to this data set. Where details have been given in Part 1, they will not be repeated here.

Oxygen

Oxygen samples were run by the micro-Winkler technique (Carpenter, 1965) in accordance with the procedure outlined in the Ocean Chemistry Division Reference Manual (1976). Due to analytical problems which were discovered well into the cruise, there is some doubt about the accuracy and precision of the analyses. We are certain that the ± 0.02 mLL^{-1} achievable by the method was not obtained here. For this reason, we have kept the records but do not report the results of oxygen determinations run during the cruise.

Salinity

In this report no units of salinity are used. The numbers given are salinity x 10^3. Salinity samples were determined at I.O.S.(Canada) on the Guildline Autosal Salinometer (Model number S/N 40-364) calibrated with IAPSO standard sea water. We compared our data with that obtained during CTD casts by Coastal Zone Oceanography approximately 9 days later.

For the deep water (200 metres or deeper) we found $\Delta, s, n = 0.0118, 0.0088, 17$ where Δ = Salinity (Ocean Chem.) - Salinity (CZO). If it is assumed that the environmental conditions had not significantly changed in the deep water during the 9 day interlude, Ocean Chemistry is reporting salinities 0.01 higher than those determined by Coastal Zone with their CTD (Guildline Analogue CTD model 8700, see Part 1 for resolution and accuracy). Based on replicate conductivity determinations (91 samples) the pooled variance ($s^2_p = \frac{1}{2n} \Sigma \Delta^2$) was calculated. From this we calculate the instrumental precision (Guildline Autosal) to be ± 0.0004 (1s).

Particulates, Dry Weight

Filters were dried at 40°C overnight and weighed on a Perkin Elmer autobalance (AD-2) to the nearest 0.01 mg. Calibration was carried out in accordance with the instruction manual using class 5 NBS weights. The instrument is very linear, and calibration does not appear to contribute significantly to error (Macdonald et al, 1983). The major weighing problem is static on the filters and this we have combatted using a Po α source static eliminator, and an anti-static gun. For the data reported here we found the blanks to be $\bar{B} \pm s_B$, (n) = 0.027 ± 0.048, (6). This corresponds to a detection limit (d.l. = 3 s_B) of 0.15 mg and a quantification limit (9.1. = 10 s_B) of 0.50 mg. For the sample volumes filtered this corresponds to d.l. $\leq$ 0.07 mgL^{-1}, q.l. $\leq$ 0.25 mgL^{-1}. If we assume variance on the sample to equal that of the blank we may estimate the overall standard deviation to be $\sqrt{2}\, s_B$ which for this data set is about 0.07 mg, or $\leq$ 0.04 mgL^{-1}. While absolute accuracy of the balance can be established with class 5 (NBS) weights to be within ± 0.01 mg, accuracy for field samples (considering filtration and sample handling) has not been established here, or in the literature. Filtration through 0.4 μm filters operationally defines particulate/dissolved, and does seem to be a reasonably precise process (see Brewer et al, 1976).

Chlorophyll a

Samples were determined with a Turner Design Fluorometer by the fluorometric method described by Strickland and Parsons (1972). Detection limits and precision achievable are reported in that reference and listed in Table 1, but have not been evaluated for the data reported here.

Coulter Counter, ppmV

Samples were analyzed immediately on board ship using a Model TAII Coulter Counter with a 200 um aperture tube. The instrument was calibrated with 9.69 um polystyrene beads in accordance with the instrument manual. For each sample, several runs in the "manometer mode" were used to see that counts were accumulating smoothly and that there was agreement between subsequent counts. The instrument was then set at 100 seconds and a larger volume was counted (15.9 mL). The volume was determined by timing the interval required to run 2.0 mL through the aperture. Precision for a

single sample can be estimated since for Poisson statistics, $s = \pm \sqrt{n}$ where n is the number of counts. We have also estimated field precision by examining counts for deep water which is unaffected by proximal particulate sources. There the variance may be expressed as s^2 (total) = s^2 (environmental) + s^2 (instrumental). Therefore s^2 (instrumental) $\leq s^2$ (total). For samples at depths 150 m or greater, and not near the bottom, we estimate the average volume of particulates, $\overline{V}$ to be $\overline{V} \pm s(n) = 0.227 \pm 0.034$ (17). This gives a coefficient of variation for the samples with the smallest numbers counted of $\leq$ 15%. Replicates which have from time to time been run are in accord with this estimated maximum.

Nutrients

Methods of analysis are reported in Part 1. Precision was estimated using blind replicates (see Part 1). The pooled estimate of standard deviation is reported in Table 1, and replicates are shown in the data Tables.

Sediment Trap Materials, Dry Weight

Methods of dry weight determination are fully described in Part 1. We examined the precision of splitting the trap contents (volumetrically), filtering and weighing. The standard deviation was a function of total amount of material but we found the coefficient of variation to be fairly constant. For 26 determinations, the highest C.V. was 11.8% and 24 were less that 5%. The overall average C.V. was 2.5%, which is slightly higher than that found for the two cruises reported in Part 1. The agreement between replicate traps at the same depth was good with an average C.V. of about 2.6%. This was better than the results reported in Part 1 but part of the explanation may be that these traps were not subjected to a sieving step (64 μm) and therefore cummulative errors of adding the different size fractions together.

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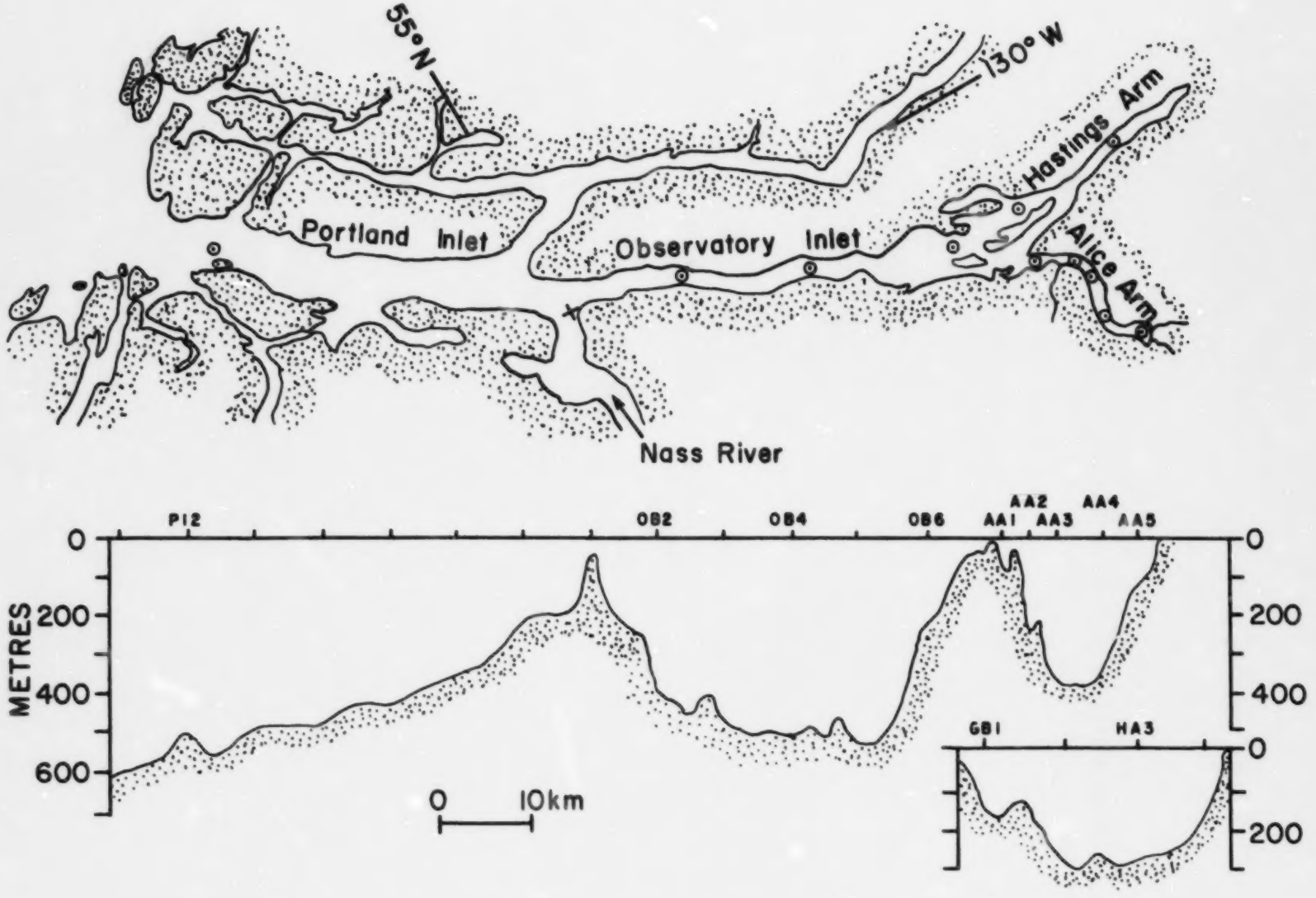


Fig. 1. Station locations

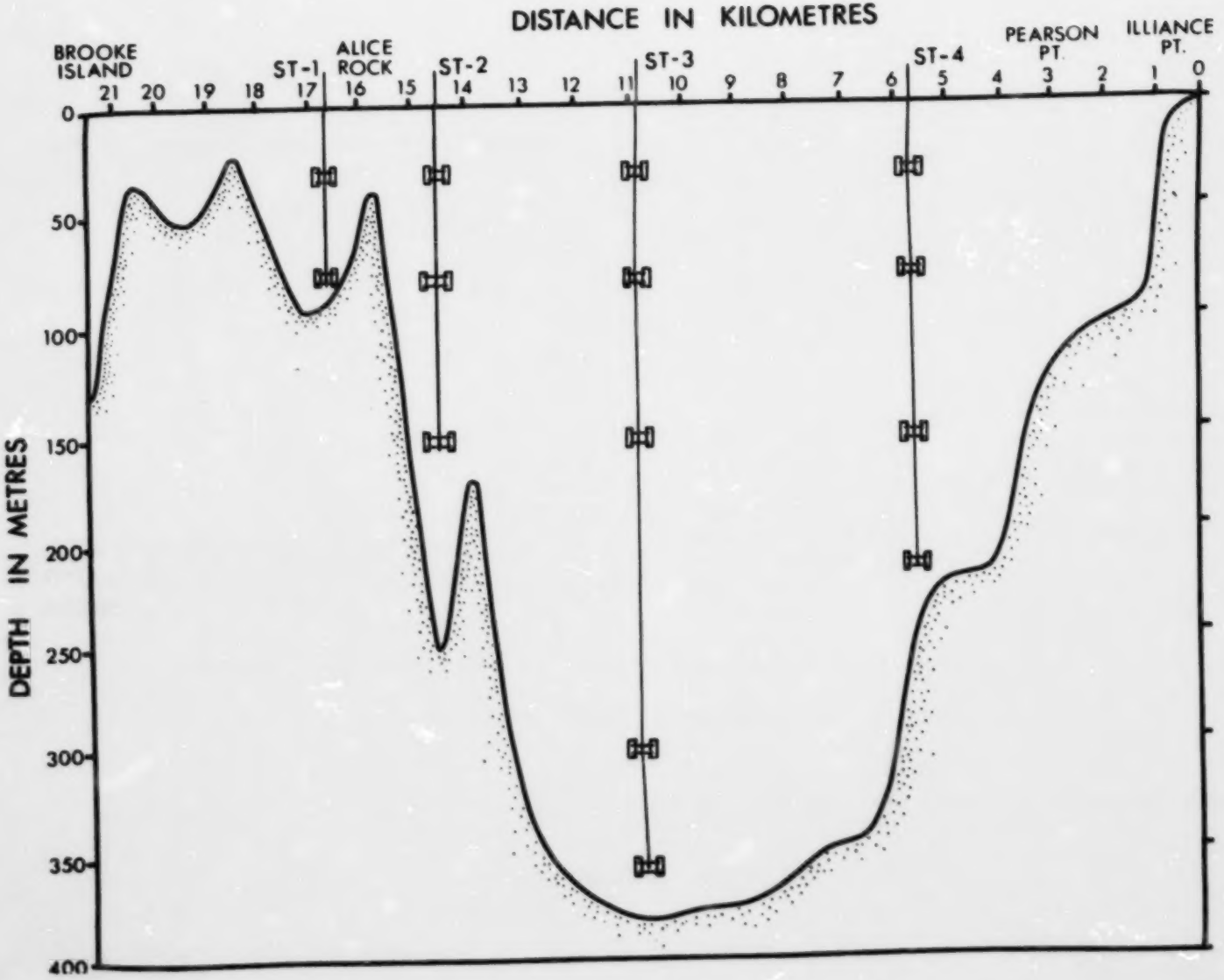


Fig. 2. Sediment trap deployment locations

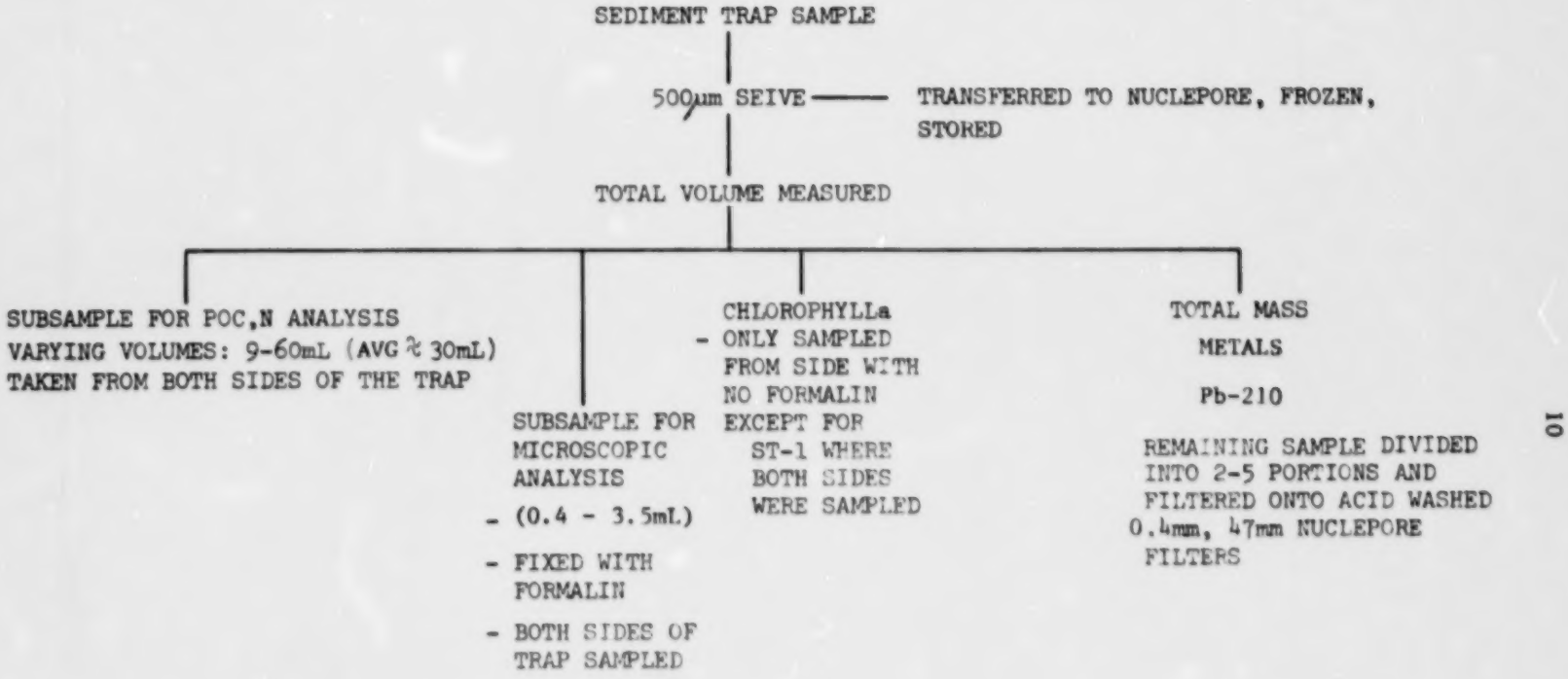

SEDIMENT TRAP SAMPLE
500μm SEIVE
TRANSFERRED TO NUCLEPORE, FROZEN, STORED
TOTAL VOLUME MEASURED
SUBSAMPLE FOR POC,N ANALYSIS
VARYING VOLUMES: 9-60mL (AVG ≈ 30mL)
TAKEN FROM BOTH SIDES OF THE TRAP
SUBSAMPLE FOR MICROSCOPIC ANALYSIS
- (0.4 - 3.5mL)
- FIXED WITH FORMALIN
- BOTH SIDES OF TRAP SAMPLED
CHLOROPHYLLa
- ONLY SAMPLED FROM SIDE WITH NO FORMALIN EXCEPT FOR ST-1 WHERE BOTH SIDES WERE SAMPLED
TOTAL MASS
METALS
Pb-210
REMAINING SAMPLE DIVIDED INTO 2-5 PORTIONS AND FILTERED ONTO ACID WASHED 0.4mm, 47mm NUCLEPORE FILTERS

Fig. 3. Sediment trap subsampling scheme

Appendix 1.

Data Tables.

TABLE 1. ESTIMATES OF PRECISION, ACCURACY AND DETECTION LIMIT

Measurement	Precision (1s)	Accuracy (1s)	Detection limit
Salinity	± 0.0004 °/oo	± 0.01	
Temperature	± 0.01 C°	± 0.02 C°	
Particulates (sea water)	± 0.04 mgL^{-1} C.V. 10%	Not Established Operationally defined	≤ 0.07 mgL^{-1}
Chlorophyll *a*	<8% (depends on concentration)[1]	Not Established	0.07 mgL^{-1}
Coulter Counter Particulate Volume	$\leq$15% (n=17)	0-4% (Coincidence) Calibrated with 9.69um Standard	Minimum total count of ten[3]
Silicate	$\pm$8% (n=14)	$\pm$8%[2]	$\sim$0.1 mmol m^{-3}
Nitrate	$\pm$1% (n=14)	$\pm$1%[2]	$\sim$0.05 mmol m^{-3}
Phosphate	$\leq\pm$23% (n=14)	23%[2] (bias component evident)	$\sim$0.03 mmol m^{-3}
Sediment trap particulate weight within traps	$\pm$2.5%	<$\pm$3%	$\leq$0.2 mg
Between replicate traps	$\pm$2.6%	No absolute check possible	

1. Estimate given in Strickland and Parsons (1972) but not evaluated here
2. Reference to Sagami Standards
3. Sheldon and Parsons (1967)

TABLE 2. STATION LOCATIONS FOR WATER SAMPLING

STATION	DATE	TIME (Z+8)	LOCATION LATITUDE N	LONGITUDE W	SAMPLES TAKEN
AA-1	26/03/82	1526	55° 24.75'	129° 40.75'	O,S,T, Nut, Chla, Part, C.C., Micro, Metals, Sed.
AA-2	26/03/82	1317	55° 26.00'	129° 40.05'	O,S,T, Nut, Chla, Part, C.C., Micro, Metals.
AA-3	25/03/82	1503	55° 27.15'	129° 37.05'	O,S,T, Nut, Chla, Part, C.C., Micro, Metals, Sed.
AA-4	25/03/82	1635	55° 26.69'	129° 32.00'	O,S,T, Nut, Chla, Part, C.C., Micro, Metals, Sed.
AA-5	27/03/82	0828	55° 27.90'	129° 29.25'	O,S,T, Nut, Chla, Part, C.C., Micro, Metals, Sed.
HA-3	27/03/82	1055	55° 32.50'	129° 47.10'	O,S,T, Nut, Chla, Part, C.C., Micro, Metals
GB-1	26/03/82	0818	55° 25.40'	129° 29.25'	O,S,T, Nut, Chla, Metals, Sed.
OB-6	27/03/82	1406	55° 21.30'	129° 45.70'	O,S,T, Nut, Chla, Metals, Sed.
OB-4	24/03/82	1546	55° 13.90'	129° 51.10'	O,S,T, Nut, Chla, Part, C.C., Micro, Metals
OB-2	28/03/82	0935	55° 6.70'	129° 57.30'	O,S,T, Nut, Chla, Metals
PI-2	28/03/82	1335	54° 43.80'N	130° 24.30'	O,S,T, Nut, Chla, Metals
ILLIANCE CREEK	26/03/82	~0800	~400m from sea		Part
KITSAULT RIVER	26/03/82	~0800	~400m from sea		Part
LIME CREEK	26/03/82	~1000	~100m from sea		Part

ABBREVIATIONS

C.C.	Coulter Counter	Nut	Nutrients (Silicate, Phosphate, Nitrate)
Chla	Chlorophylla	O	Dissolved oxygen
Metals	Dissolved trace metals	Part	Particulates by filtration
Micro	Particulates for microscopic examination	Sed	Bottom sediments (grab sample)

TABLE 3. ALICE ARM CHEMICAL DATA (MARCH 1982, OC-82-IS-001)

STATION AA-1 26/03/82 1526 (Z+8) Bottlecast DEPTH 86m

DEPTH m	TEMP. °C	SALINITY X10^3	SIGMA T *	CHLa mg m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}	SUSP. mgL^{-1}	PART. mLL^{-1}
5	5.66	31.13	24.57	4.68	1.51	35.2	18.3	1.63	1.97
25	5.65	31.12	24.56	4.53	1.75	35.2	18.6	1.67	2.11
50	5.65	31.15	24.58	4.38	1.76	35.6	18.5	1.80	1.99
75	5.69	31.21	24.63	4.68	2.00	40.1	20.6	1.57	2.22

STATION AA-2 26/03/82 1317 (Z+8) Bottlecast DEPTH 258m

DEPTH m	TEMP. °C	SALINITY X10^3	SIGMA T	CHLa mg m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}	SUSP. mgL^{-1}	PART. mLL^{-1}
5	5.39	30.73	24.28	7.10	2.14	32.3	16.2	2.02	3.46
25	5.50	31.07	24.54	3.02	2.00	38.4	19.9	1.34	1.79
50	5.47	31.11	24.57	1.96	1.79	41.3	21.2	1.20	1.19
75	5.42	31.12	24.59	1.78	1.97	39.2	20.1	1.25	1.22
100	5.42	31.16	24.62	1.20	2.06	39.8	20.1	0.96	0.75
150	5.34	31.22	24.67		2.15	46.8	23.8	0.62	0.23
200	5.35	31.23	24.68		2.14	46.4	23.7	0.69	0.26
250	5.34	31.24	24.69		2.08	43.9	22.8	0.82	0.30

* Sigma t has been calculated according to Knudsen's formula (see Fofonoff, N.P., 1962, in The Sea V.1, M.N. Hill ed., eqn 24, p 9) and is unitless.

$$\sigma_{t_{Knudsen}} = \left(\frac{\rho\ (s,t,o)}{\rho_{max}} - 1 \right) \times 1000 \text{ where } \rho_{max} = 0.999975 \text{ g cm}^{-3}$$

TABLE 3 (CONTINUED)

STATION AA-3 25/03/82 1503 (Z+8) Bottlecast DEPTH 386m

DEPTH m	TEMP. ^{o}C	SALINITY $X10^{3}$	SIGMA T	CHLa mg m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}	SUSP. mgL^{-1}	PART. mLL^{-1}
5	5.55	30.68	24.22	4.68	1.74	34.7	16.9	1.68	2.80
25	5.52	31.03	24.50	2.14	1.50	39.0	19.9	1.06	1.53
50	5.46	31.13	24.59	1.01	1.68	38.8	19.8	0.39	0.90
75	5.43	31.16	24.62	0.49	1.81	42.9	21.6	0.61	0.58
100	5.32	31.21	24.60		1.88	48.5	24.3	0.57	0.25
150	5.37	31.24	24.69		2.02	51.9	26.0	0.80	0.20
200	5.36	31.25	24.69		1.94	50.8	25.4	0.62	0.20
250	5.39	31.26	24.70		2.65,1.85	42.3,49.1	21.8,22.3	0.48	0.18
300	5.37	31.26	24.70		2.58	47.1	23.8	0.71	0.26
350	5.39	31.28	24.71		1.89	47.1	22.9	2.44	0.53

TABLE 3 (CONTINUED)

STATION AA-4 25/03/82 1635 (Z+8) Bottlecast DEPTH 278m

DEPTH m	TEMP. ^{o}C	SALINITY $X10^{3}$	SIGMA T	CHLa mg m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}	SUSP. mgL^{-1}	PART. mLL^{-1}
5	5.47	30.77	24.30	4.98	1.93	39.1	20.0	1.53	1.91
25	5.48	31.07	24.54	2.95	1.81,1.12	34.7,39.1	18.1,20.3	1.05	1.35
50	5.46	31.10	24.56	1.26	1.68	38.7	19.1	0.79	0.80
75	5.37	31.17	24.63	0.19	2.63	45.9	23.2	1.45	0.43
100	5.34	31.16	24.63	0.08	2.61	47.4	24.0	3.27	0.75
150	5.34	31.24	24.69		2.38	48.8	24.6	1.97	0.43
200	5.35	31.26	24.70		2.19	47.9	24.0	1.55	0.40
250	5.35	31.26	24.70		2.14	47.3	23.5	2.34	0.58
270	5.38	31.26	24.70		2.19	50.5	25.5	2.40	

STATION AA-5 27/03/82 0828 (Z+8) Bottlecast DEPTH 104m

DEPTH m	TEMP. ^{o}C	SALINITY $X10^{3}$	SIGMA T	CHLa mg m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}	SUSP. mgL^{-1}	PART. mLL^{-1}
5	5.45	30.97	24.46	4.38	2.36	47.5	25.2	1.48	2.10
25	5.42	31.09	24.56	0.97	1.68	44.2	22.7	0.78	0.64
50	5.41	31.14	24.60	0.47	2.58,1.50	45.1,44.7	22.7,22.4	0.78	0.44
75	5.35	31.18	24.64	0.10	2.93	46.5	23.3	0.82	0.26
90	5.33	31.21	24.67	0.10	2.91	43.0	21.5	2.77	0.54

TABLE 3 (CONTINUED)

STATION HA-3 27/03/82 1055 (Z+8) Bottlecast DEPTH 282m

DEPTH m	TEMP. °C	SALINITY X10^3	SIGMA T	CHLa mg m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}	SUSP. mgL^{-1}	PART. mLL^{-1}
5	5.65	30.92	24.40	40.47	0.74	9.1	6.7	4.36	10.69
25	5.47	31.04	24.52	2.24	1.71	39.3	20.0	0.86	1.69
50	5.73	31.45	24.81	0.77	1.97	47.7	23.8	0.83	0.86
75	6.16	31.66	24.92	0.16	2.06	49.1	24.7	0.42	0.32
100	6.62	31.80	24.98	0.11	2.06	50.2	25.4	0.41	0.32
150	6.70	31.87	25.02		2.12	50.2	25.4	0.41	0.27
200	6.86	31.94	25.06		2.28	54.9	26.9	0.46	0.25
250	6.89	31.98	25.08		2.42	58.3	28.0	0.50	0.22

STATION GB-1 26/03/82 0802 (Z+8) Bottlecast DEPTH 115m

DEPTH M	TEMP. °C	SALINITY X10^3	SIGMA T	CHLa mg m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}	SUSP. mgL^{-1}	PART. mLL^{-1}
5	5.55	30.76	24.29	5.61	0.98	20.1	7.0	2.28	5.96
25	5.44	31.14	24.60	3.78	1.61	34.7	17.9	1.27	2.78
50	5.62	31.41	24.79	0.84	2.18,1.92	43.7	21.9,21.8	0.67	1.20
75	6.04	31.74	25.00	0.24	2.22	50.6	24.4	0.79	0.42
100	6.35	31.89	25.08	0.16	2.52	53.8	25.0	1.46	0.89

TABLE 3 (CONTINUED)

STATION OB-4 24/03/82 1406 (Z+8) Bottlecast DEPTH 503m

DEPTH m	TEMP. °C	SALINITY X10^3	SIGMA T	CHLa mg m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}	SUSP. mgL^{-1}	PART. mLL^{-1}
5	5.75	30.78	24.28	6.00	1.73	14.2	7.7	2.50	5.64
25	5.63	30.10	23.76	5.74	2.19	26.6	15.1	1.35	3.23
50	5.53	31.19	24.63	0.95	2.47	37.4	19.0	0.51	0.59
75	5.51	31.45	24.84	0.17	2.79,1.90	44.5,43.8	22.1,22.3	0.37	0.26
100	5.84	31.75	25.03	0.13	2.94	47.7	24.5	0.40	0.24
150	6.57	32.25	25.34		3.59	50.1	27.1	0.68	0.37
200	6.93	32.42	25.42		3.79	52.9	28.1	0.31	0.19
250	6.87	32.50	25.49		3.78,2.24	55.2,57.9	27.8,27.9	0.42	0.23
300	6.89	32.55	25.53		3.76	56.1	28.0	0.34	0.21
400	6.86	32.60	25.57		3.91	57.2	28.6	0.44	0.23
500	6.89	32.63	25.59		3.93	59.0	29.4	0.56	0.26

TABLE 3 (CONTINUED)

STATION OB-2 28/03/82 1546 (Z+8) Bottlecast DEPTH 430m

DEPTH m	TEMP. °C	SALINITY X10^3	SIGMA T	CHLa mg m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}	SUSP. PART. mgL^{-1} mLL^{-1}
5	5.63	30.98	24.45	14.47	0.85	9.3	7.3	
25	5.58	31.19	24.62	2.87	1.46	36.3	18.1	
50	5.71	31.53	24.88	8.89	1.81,1.90	42.3,42.4	21.7,21.1	
75	6.16	31.96	25.16	0.44	1.88	44.2	22.8	
100	6.30	32.12	25.27	0.45	1.95	45.5	23.5	
150	6.58	32.37	25.43		2.11	49.9	25.2	
200	6.73	32.47	25.49		2.30	55.2	27.1	
250	6.82	bottle leaked						
300	6.84	32.57	25.55		2.39,2.53	60.3,58.5	29.2,25.8	
400	6.87	32.58	25.56		2.33	58.8	28.5	

STATION OB-6 27/03/82 1406 (Z+8) Bottlecast DEPTH 242m

DEPTH m	TEMP. °C	SALINITY X10^3	SIGMA T	CHLa mg m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}	SUSP. PART. mgL^{-1} mLL^{-1}
5	5.75	30.88	24.36	11.47	0.83	20.3	6.7	
25	5.75	31.21	24.62	3.70	1.51	33.2	17.2	
50	5.79	31.46	24.81	1.12	1.80	43.4	21.3	
75	5.98	31.76	25.02	0.15	1.85	46.7	23.5	
100	6.30	32.00	25.17	0.10	1.95,1.50	49.4,51.2	24.8,24.5	
150	6.75	32.30	25.35		2.20	52.9	26.4	
200	6.88	32.41	25.42		2.01	55.9	27.1	

TABLE 3 (CONTINUED)

STATION PI-2 28/03/82 1335 (Z+8) Bottlecast DEPTH 540m

DEPTH m	TEMP. °C	SALINITY X10^{3}	SIGMA T	CHLa mg m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}	SUSP. PART. mgL^{-1} mLL^{-1}
5	6.06	30.95	24.38	9.51	0.94	12.3	7.2	
25	6.22	31.14	24.51	0.91	1.27	25.4	13.7	
50	6.17	31.47	24.77	0.61	1.37	30.1	16.0	
75	5.99	31.69	24.97	0.33	1.62,1.79	38.1,39.8	20.1,20.2	
100	6.23	32.11	25.27	0.12	1.95	47.3	24.3	
150	6.59	32.57	25.59		2.17,2.20	51.0,50.5	25.9,25.7	
200	6.70	32.71	25.68		2.08	54.2	27.0	
250	6.77	32.83	25.77		2.27	55.3	28.0	
300	6.81	32.86	25.78		2.28,1.76	56.9,56.1	28.5,28.1	
350	6.85	32.89	25.80		2.27	57.9	28.7	
400	6.87	32.90	25.81		2.23	59.0	28.7	
450	6.87	32.91	25.82		2.30,2.24	57.9,57.2	28.6,28.9	
500	6.89	32.91	25.81		2.16	57.2	28.1	
530	6.90	32.91	25.80		2.01,2.00	57.4,57.9	28.6,28.7	

ILLIANCE CREEK	0.15
KITSAULT RIVER	0.46
LIME CREEK	2.52

TABLE 4(a). SUMMARY OF COULTER COUNTER DATA

COUNTS PER CHANNEL APPLIED TO A VOLUME OF 15.87 ML

STN	DEP M	COULTER COUNTER CHANNEL # 3	4	5	6	7	8	9	10	11	12	13	14	15
AA1	5	17931	8518	4329	2347	1483	1319	1028	289	340	329	121	19	0
AA1	25	17730	8857	4823	2671	1807	1456	815	438	581	314	92	17	1
AA1	50	18942	9047	4439	2519	1700	1418	891	363	483	343	83	11	1
AA1	75	16661	8623	4618	2568	1708	1462	896	359	425	401	133	19	0
AA2	5	15518	9094	5315	2428	1975	1415	811	684	1155	772	134	16	1
AA2	25	17428	8342	4023	2163	1381	1042	672	269	343	297	109	20	1
AA2	50	14363	6849	3425	1854	1118	757	507	170	265	229	43	7	0
AA2	75	16694	7710	3720	1944	1186	749	450	197	239	198	62	10	0
AA2	100	15103	6854	3275	1676	907	545	360	139	113	121	21	1	2
AA2	150	13645	5567	2579	1103	439	191	84	41	16	7	1	0	0
AA2	200	15418	6588	2860	1266	515	244	120	39	17	7	0	0	0
AA2	250	17598	7396	3328	1446	608	255	136	48	19	9	0	0	0
AA3	5	19487	10230	4989	2408	1659	1308	678	606	895	608	105	7	1
AA3	25	16712	7059	3470	1825	1107	735	404	306	402	293	70	7	1
AA3	50	13530	6045	2778	1474	819	596	305	161	168	161	51	1	0
AA3	75	14453	5945	2534	1350	842	534	312	143	125	48	10	1	2
AA3	100	15445	6156	2587	1015	384	190	97	36	11	8	0	3	0
AA3	150	19021	6808	2503	949	296	97	55	25	4	2	1	0	0
AA3	200	16590	6471	2436	905	326	149	60	17	6	5	0	0	0
AA3	250	12578	5210	2205	798	294	132	72	22	8	4	2	0	0
AA3	300	16815	6968	2760	1056	387	154	80	29	13	11	4	0	0
AA3	350	46141	18872	7422	2541	772	290	109	48	19	2	0	1	0
AA4	5	13669	6804	3973	2098	1453	940	543	463	619	397	59	4	0
AA4	25	13533	5994	3029	1782	1224	767	482	341	450	248	29	2	1
AA4	50	12686	5439	2742	1504	868	585	379	198	212	94	13	9	1
AA4	75	27018	11440	5161	2061	729	301	140	66	39	13	2	0	0
AA4	100	51957	21500	9788	4042	1621	636	253	77	21	10	0	1	0
AA4	150	32717	12971	5286	1846	683	259	127	43	21	6	1	0	1
AA4	200	25997	10659	4642	1900	837	378	143	45	15	8	0	0	1
AA4	250	32549	14148	6778	3120	1439	632	246	73	24	9	0	1	0

TABLE 4(a). SUMMARY OF COULTER COUNTER DATA

COUNTS PER CHANNEL APPLIED TO A VOLUME OF 15.87 ML

STN	DEP M	COULTER COUNTER CHANNEL # 3	4	5	6	7	8	9	10	11	12	13	14	15
HA3	150	8192	4308	2233	1122	541	267	133	74	31	13	4	1	0
HA3	200	9771	4793	2471	1182	543	242	125	53	30	8	3	0	0
HA3	250	10510	5949	3280	1378	472	139	70	30	12	4	0	0	0
HA5	5	62482	32536	13020	8104	7240	8630	3633	1413	1388	542	131	75	4
HA5	5	36350	16377	8419	6384	6827	7824	3017	1181	1110	520	117	119	31
HA5	25	21963	9100	5974	4606	3068	2169	1262	660	559	276	87	65	8
HA5	50	24782	10787	3946	2123	1175	746	420	145	128	81	33	53	4
HA5	75	18443	7742	3683	1629	778	420	209	86	48	11	0	5	0
HA5	100	34319	15206	6351	2451	1082	501	214	78	34	9	1	43	7
OB4	5	23244	11086	5032	2390	1393	912	568	313	654	1187	718	77	0
OB4	25	15846	7033	3564	1960	1078	651	457	268	355	579	414	46	2
OB4	50	12376	5841	2961	1648	889	442	238	121	84	62	28	4	0
OB4	75	8224	3866	2052	1089	534	348	143	66	29	8	2	1	0
OB4	100	9021	4272	2157	1053	460	268	152	52	14	8	3	1	0
OB4	150	10676	5295	2705	1406	798	484	224	98	41	17	3	1	0
OB4	200	6483	3214	1821	828	421	196	124	34	19	6	1	1	0
OB4	200	6745	3304	1749	830	400	197	100	31	19	10	3	1	0
OB4	200	6319	3169	1631	748	391	206	104	36	12	9	0	0	1
OB4	250	9639	4682	2384	1101	429	203	74	46	12	7	7	1	0
OB4	300	9870	4833	2397	984	431	166	57	46	41	3	0	0	0
OB4	400	10120	5156	2681	1217	469	184	68	36	14	12	5	0	0
OB4	500	12137	6646	3615	1682	583	198	63	18	10	6	2	1	0
AA5	5	14686	6686	3386	2179	1526	835	577	583	1122	301	24	6	0
AA5	25	10019	4470	2502	1430	766	376	221	158	200	96	10	2	0
AA5	50	11703	4987	2688	1347	715	382	167	112	90	40	1	1	2
AA5	75	16228	6625	2613	1108	469	164	87	51	14	8	4	0	0
AA5	90	42154	16763	6993	2881	1061	350	139	41	17	5	2	1	0
HA3	5	48975	21842	10509	8612	7766	9564	7357	2810	3123	1672	315	45	7
HA3	25	41994	24347	7865	4075	2400	1698	1039	560	401	107	13	3	0
HA3	50	24009	10805	4389	2292	1408	819	570	363	196	35	3	1	0
HA3	75	10247	5009	2654	1361	708	400	216	87	47	7	1	0	0
HA3	100	9453	4766	2557	1216	611	345	183	71	42	17	2	0	1

TABLE 4(b). VOLUME OF PARTICLES IN THE CHANNELS AND SAMPLE CALCULATION OF VOLUME (ppmV) FROM COULTER COUNTER DATA

CRUISE: OC-82-IS-001 ALICE ARM

CHANNEL #	GEOMETRIC MEAN VOL. μ^3	BAND WIDTH
3	47.39	1.04
4	94.78	1.31
5	189.60	1.65
6	379.10	2.08
7	758.30	2.62
8	1516.00	3.30
9	3033.00	4.20
10	6066.00	5.20
11	12130.00	6.60
12	24270.00	7.70
13	48540.00	10.50
14	97180.00	13.20
15	194400.00	16.60

EXAMPLE CALCULATION

$$\text{VOL(ppmV)} = \frac{\text{GMV } (\mu^3)) \times \#\text{ PARTICLES}}{\text{SAMPLE VOL (mL)} \times 10^6}$$

i.e. $$\frac{47.39 \times 17931}{15.8 \times 10^6} = 0.0538$$

STATION AA-1
DATE 26/03/82
DEPTH 5
VOLUME OF SAMPLE = 15.80 mL

CHANNEL	# PARTICLES	COINCIDENCE CORRECTION FOR # OF PARTICLES	VOLUME (ppmV)	NORMALIZED VOLUME
3	17931	1.0	0.0538	0.0517
4	8518	1.0	0.0511	0.0390
5	4329	1.0	0.0519	0.0315
6	2347	1.0	0.0563	0.0271
7	1483	1.0	0.0712	0.0272
8	1319	1.0	0.1266	0.0384
9	1028	1.0	0.1973	0.0470
10	289	1.0	0.1110	0.0213
11	340	1.0	0.2610	0.0395
12	329	1.0	0.5054	0.0656
13	121	1.0	0.3717	0.0354
14	19	1.0	0.1169	0.0089
15	0	1.0	0.0000	0.0000

TOTAL VOLUME OF PARTICLES = 1.9741 ppmV

TABLE 5. SEDIMENT TRAP STATIONS

STATION	LOCATION LAT. °N	LOCATION LONG. °W	TRAP DEPTH (METERS)	DEPLOYED 24/03/82 TIME	RECOVERED 03/04/82	DEPLOYMENT INTERVAL (DAYS)
ST-1 (97m)	55°24.57'	129°41.11	30	2328	1140	9.50
			67	2332	1135	9.50
ST-2 (256m)	55°25.92'	129°40.16'	30	2247	1110	9.50
			70	2252	1105	9.50
			150	2255	1100	9.51
			226	2259	1055	9.52
ST-3 (387m)	55°27.17'	129°36.92'	30	2046	1010	9.53
			70	2049	1005	9.54
			150	2056	0955	9.54
			300	2100	0950	9.55
			353	2103	0945	9.56
ST-4 (245m)	55°26.75'	129°31.55'	30	2143	0855	9.44
			70	2146	0850	9.45
			150	2150	0840	9.46
			208	2153	0830	9.47

TABLE 6(a). SEDIMENT TRAP SUBSAMPLING DATA MARCH/APRIL 1982

SIDE a - TRAP CONTAINING FORMALIN + DYE
SIDE b - NO FORMALIN OR DYE

STN.	DEPTH (m)	TIME (DAYS)	SIDE OF TRAP	TOTAL VOLUME (mL)	VOLUME FOR POC,N ANALYSIS (mL)	VOLUME FOR CHLa ANALY. (mL)	VOLUME FOR MICRO-SCOPE ANALY. (mL)	SUBSAMPLES FOR METAL ANALYSIS AND DRY WEIGHT DETERMINATION		
								VOL. (mL)	WEIGHT OF SEDIMENT (mg)	CONC. (gL^{-1})
ST-1	30	9.50	a[1]	590	30 36 31	8.4	2.2	198 194	398.3 410.9	2.01 2.12
			b	645	31	6.6	2.4	244 246	485.6 490.2	1.99 1.99
	67	9.49	a[1]	730	27	-	1.8	232 240	535.1 588.0	2.31 2.45
			b	790	22	6.6	2.5	240 236	523.7 532.5	2.18 2.26
ST-2	30	9.50	a	530	24	-	2.6	198 194	409.8 417.0	2.07 2.15
			b	610	23	9.3	1.5	216 210	411.8 394.2	1.91 1.88
	70	9.50	a	505	31	-	2.5	192 192	470.6 471.3	2.45 2.45
			b	596	30	7.0	1.7	202 198	436.6 429.3	2.16 2.17

TABLE 6(a). SEDIMENT TRAP SUBSAMPLING DATA (CONTINUED) MARCH/APRIL 1982

SIDE a - TRAP CONTAINING FORMALIN + DYE
SIDE b - NO FORMALIN OR DYE

STN.	DEPTH (m)	TIME (DAYS)	SIDE OF TRAP	TOTAL VOLUME (mL)	VOLUME FOR POC,N ANALYSIS (mL)	VOLUME FOR CHLa ANALY. (mL)	VOLUME FOR MICRO-SCOPE ANALY. (mL)	SUBSAMPLES FOR METAL ANALYSIS AND DRY WEIGHT DETERMINATION		
								VOL. (mL)	WEIGHT OF SEDIMENT (mg)	CONC. (gL^{-1})
ST-2	150	9.51	a	510	30	-	1.8	400	1074.8	2.69
			b	548	30	7.2	2.2	205	508.61	2.48
								192	559.54	2.46
	226	9.52	a[2]	556	30	-	1.8	250	894.6	3.58
								150	559.5	3.73
			b	640	30	6.8	2.0	500	1633.4	3.27
ST-3	30	9.53	a	618	40	-	3.5	230	234.0	1.02
								227	220.9	0.97
			b	655	40	6.3	2.2	250	240.7	0.96
								246	490.2	0.96
	70	9.54	a	575	40	-	1.8	234	259.2	1.11
								234	221.0	0.94
			b[2]	510	40	7.8	2.2	206	258.4	1.25[4]
								198	133.3	0.67
								67	70.64	1.07

TABLE 6(a). SEDIMENT TRAP SUBSAMPLING DATA (CONTINUED) MARCH/APRIL 1982

SIDE a - TRAP CONTAINING FORMALIN + DYE
SIDE b - NO FORMALIN OR DYE

STN.	DEPTH (m)	TIME (DAYS)	SIDE OF TRAP	TOTAL VOLUME (mL)	VOLUME FOR POC, N ANALYSIS (mL)	VOLUME FOR CHL a ANALY. (mL)	VOLUME FOR MICRO-SCOPE ANALY. (mL)	SUBSAMPLES FOR METAL ANALYSIS AND DRY WEIGHT DETERMINATION		
								VOL. (mL)	WEIGHT OF SEDIMENT (mg)	CONC. (gL^{-1})
ST-3	150	9.54	a	600	30	-	2.0	235	283.0	1.20
								242	309.5	1.28
			b	626	30	7.8	3.3	238	305.1	1.28
								214	277.2	1.30
	300	9.55	a	560	30	-	2.5	218	523.3	2.40
								224	556.4	2.48
			b	576	30	7.8	2.2	235	549.6	2.34
								230	551.1	2.40
	353	9.56	a	600	60	-	1.0	94	841.0	8.95
								90	844.8	9.39
								96	908.0	9.46
								98	937.8	9.57
								92	907.7	9.87
			b	700	70	4.3	1.5	106	830.9	7.84
								106	877.5	8.28
								102	841.0	8.25
								112	941.1	8.40
								134	1118.4	8.35

TABLE 6(a). SEDIMENT TRAP SUBSAMPLING DATA (CONTINUED) MARCH/APRIL 1982

SIDE a - TRAP CONTAINING FORMALIN + DYE
SIDE b - NO FORMALIN OR DYE

STN.	DEPTH (m)	TIME (DAYS)	SIDE OF TRAP	TOTAL VOLUME (mL)	VOLUME FOR POC,N ANALYSIS (mL)	VOLUME FOR CHLa ANALY. (mL)	VOLUME FOR MICRO-SCOPE ANALY. (mL)	SUBSAMPLES FOR METAL ANALYSIS AND DRY WEIGHT DETERMINATION		
								VOL. (mL)	WEIGHT OF SEDIMENT (mg)	CONC. (gL^{-1})
ST-4	30	9.44	a[1]	500	30	-	3.7	250	149.0	0.60
								212	121.0	0.57
			b[2]	435	30	7.0	1.8	202	130.2	0.64
								194	126.2	0.65
	70	9.45	a	592	26	-	1.7	250	740.3	2.96
								250	741.3	2.97
			b	568	26	6.4	1.8	250	735.4	2.94
								250	722.6	2.89
	150	9.46	a	620	12	-	0.5	238	8578.1	36.04
								248	8788.9	35.44
			b	825	12	1.8	0.4	250	6826.8	27.31
								252	6853.9	27.20
								248	6805.5	27.44

TABLE 6(a). SEDIMENT TRAP SUBSAMPLING DATA (CONTINUED) MARCH/APRIL 1982

SIDE a - TRAP CONTAINING FORMALIN + DYE
SIDE b - NO FORMALIN OR DYE

STN.	DEPTH (m)	TIME (DAYS)	SIDE OF TRAP	TOTAL VOLUME (mL)	VOLUME FOR POC,N ANALYSIS (mL)	VOLUME FOR CHLa ANALY.	VOLUME FOR MICRO-SCOPE ANALY. (mL)	SUBSAMPLES FOR METAL ANALYSIS AND DRY WEIGHT DETERMINATION		
								VOL. (mL)	WEIGHT OF SEDIMENT (mg)	CONC. (gL^{-1})
ST-4	208	9.47	a[3,5]	950	11	-	0.4	938.6	77,885.0	82.98
			b[5]	880	-	-	-	200	20,740.0	103.7
								222	22,555.2	101.6
								196	20,148.8	102.8
								250	26,175.0	104.7

(1) DYE FLUSHED OUT OF TRAP
(2) Small amount of 1st metal subsample leaked during filtration
(3) Confusion during subsampling, therefore, all subsample weights were combined
(4) Value suspiciously low - leak during filtration
(5) Mine tailings visible

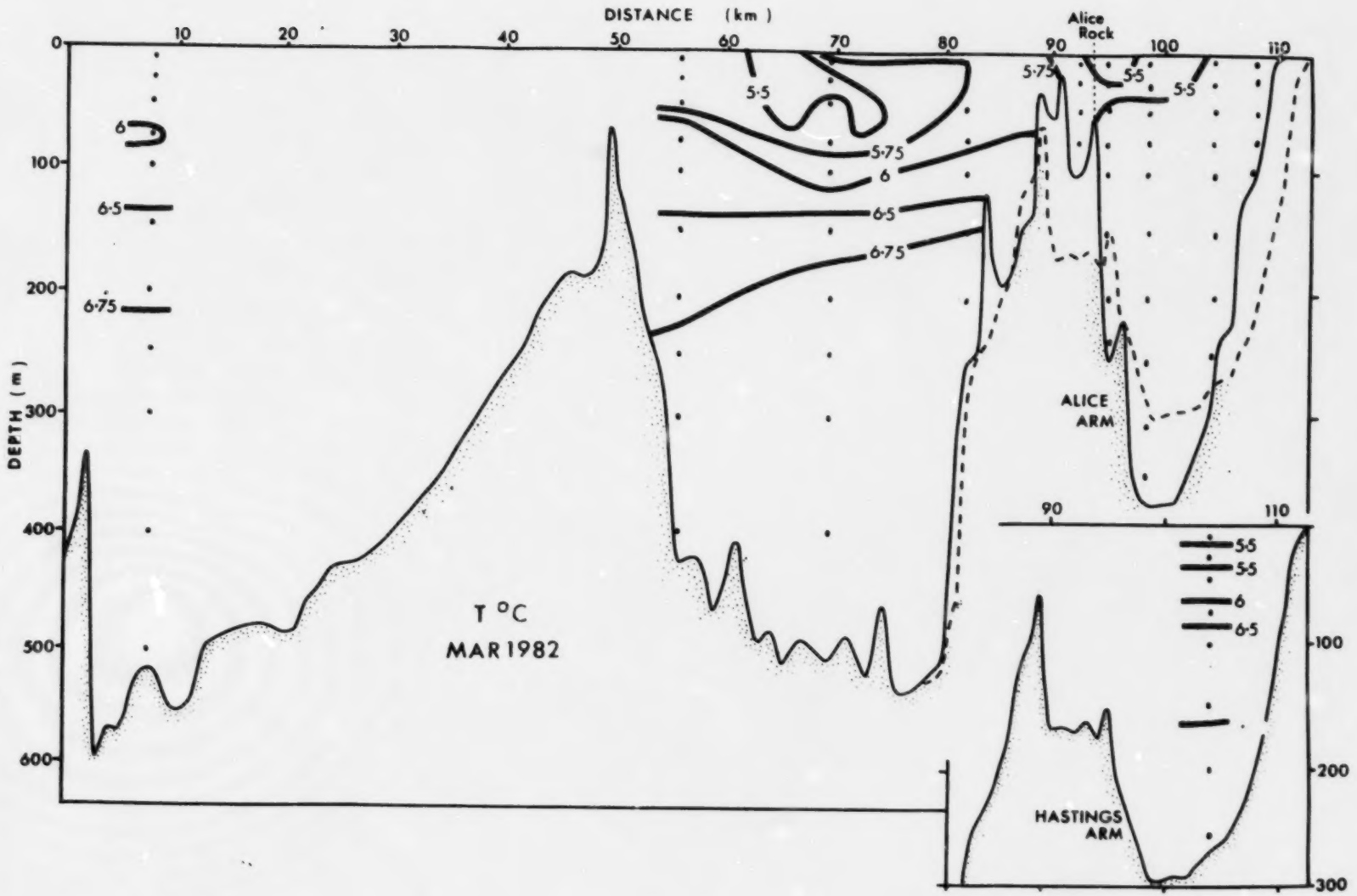
TABLE 6(b). AMOUNTS CAUGHT IN SEDIMENT TRAPS, MARCH/APRIL 1982

STATION	DEPTH	TOTAL SEDIMENTATION gm^{-2} day^{-1} DRY WEIGHT ($\bar{X}\pm s$ (n)) a) Formaldehyde + Dye	b) No Preservative	SEDIMENTATION gm^{-2} day^{-1} a and b sides $\bar{X}\pm s$
ST-1	30	9.95 ± 0.37(2)	10.47 ± 0.00(2)	10.21 ± 0.37
	67	14.19 ± 0.59(2)	14.33 ± 0.36(2)	14.26 ± 0.10
ST-2	30	9.13 ± 0.24(2)	9.43 ± 0.11(2)	9.28 ± 0.21
	70	10.10 ± 0.00(2)	10.53 ± 0.04(2)	10.32 ± 0.30
	150	11.18	11.03 ± 0.06(2)	11.11 ± 0.11
	226	*16.55 ± 0.48(2)	17.04	16.97 ± 0.11
ST-3	30	5.00 ± 0.18(2)	5.11 ± 0.00(2)	5.06 ± 0.08
	70	4.79 ± 0.56(2)	4.81 ± 0.53(2)	4.80 ± 0.01
	150	6.05 ± 0.28(2)	6.56 ± 0.07(2)	6.31 ± 0.36
	300	11.09 ± 0.26(2)	11.08 ± 0.20(2)	11.09 ± 0.01
	353	46.01 ± 1.62(5)	46.71 ± 1.26(5)	46.36 ± 0.49
ST-4	30	2.40 ± 0.09(2)	2.30 ± 0.03(2)	2.35 ± 0.07
	70	14.40 ± 0.03(2)	13.58 ± 0.16(2)	13.99 ± 0.58
	150	181.6 ± 2.2 (2)	184.7 ± 0.8 (3)	183.2 ± 2.2
	208	645.3	743.4 ± 9.5 (4)	694.0 ±69.0

* One filter leaked slightly
Average is taken from 16.89 and 17.04

Appendix 2.

Longitudinal sections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20
30
40
50
60
70
80
90
100
110
Alice Rock
DEPTH (m)
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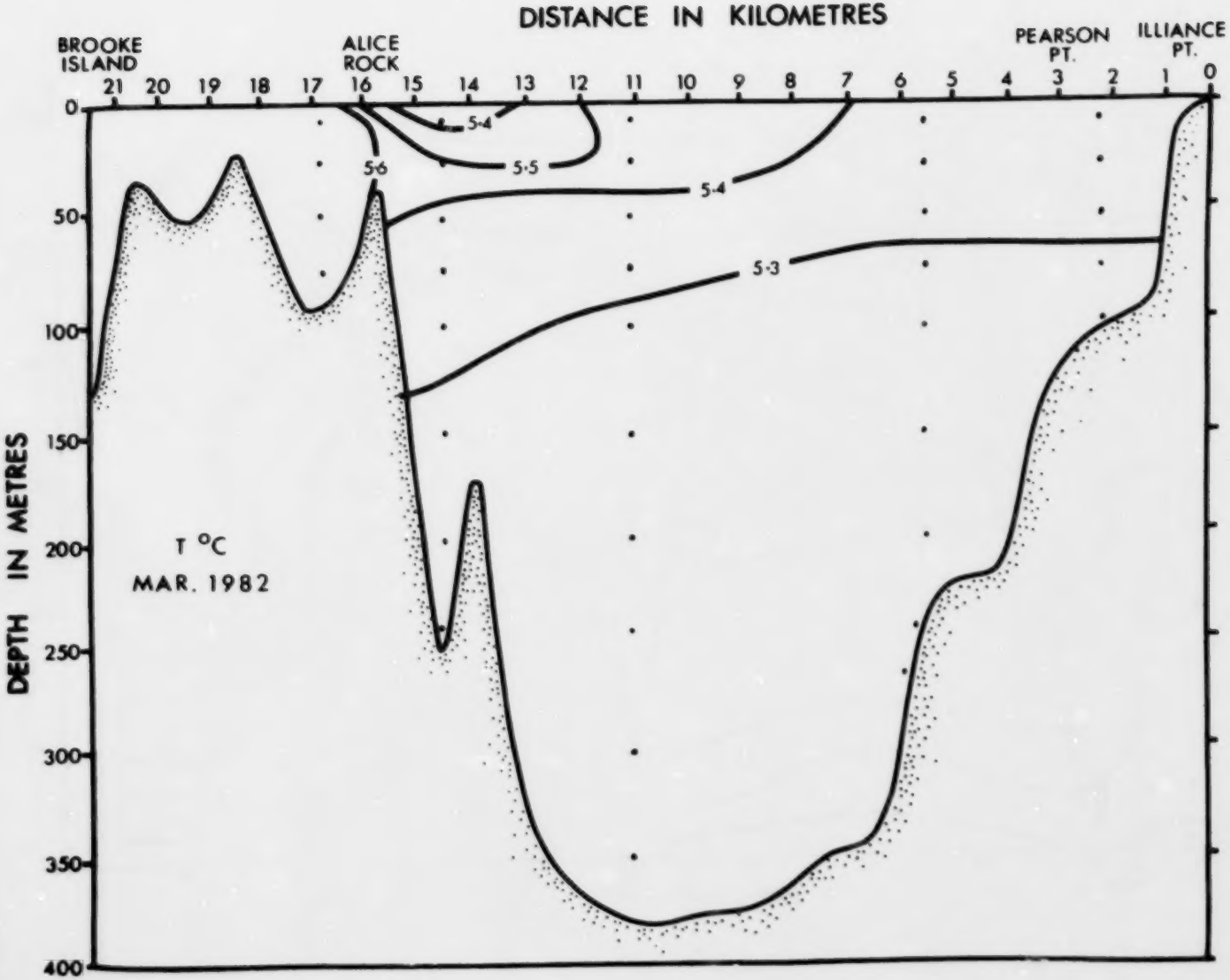
200
300
400
500
600
6
6·5
6·75
5·5
5·75
6
6·5
6·75
5·75
5·5
5·5
T °C
MAR 1982
ALICE ARM
90
110
5·5
5·5
6
6·5
100
200
300
HASTINGS ARM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ALICE ROCK
PEARSON PT.
ILLIANCE PT.
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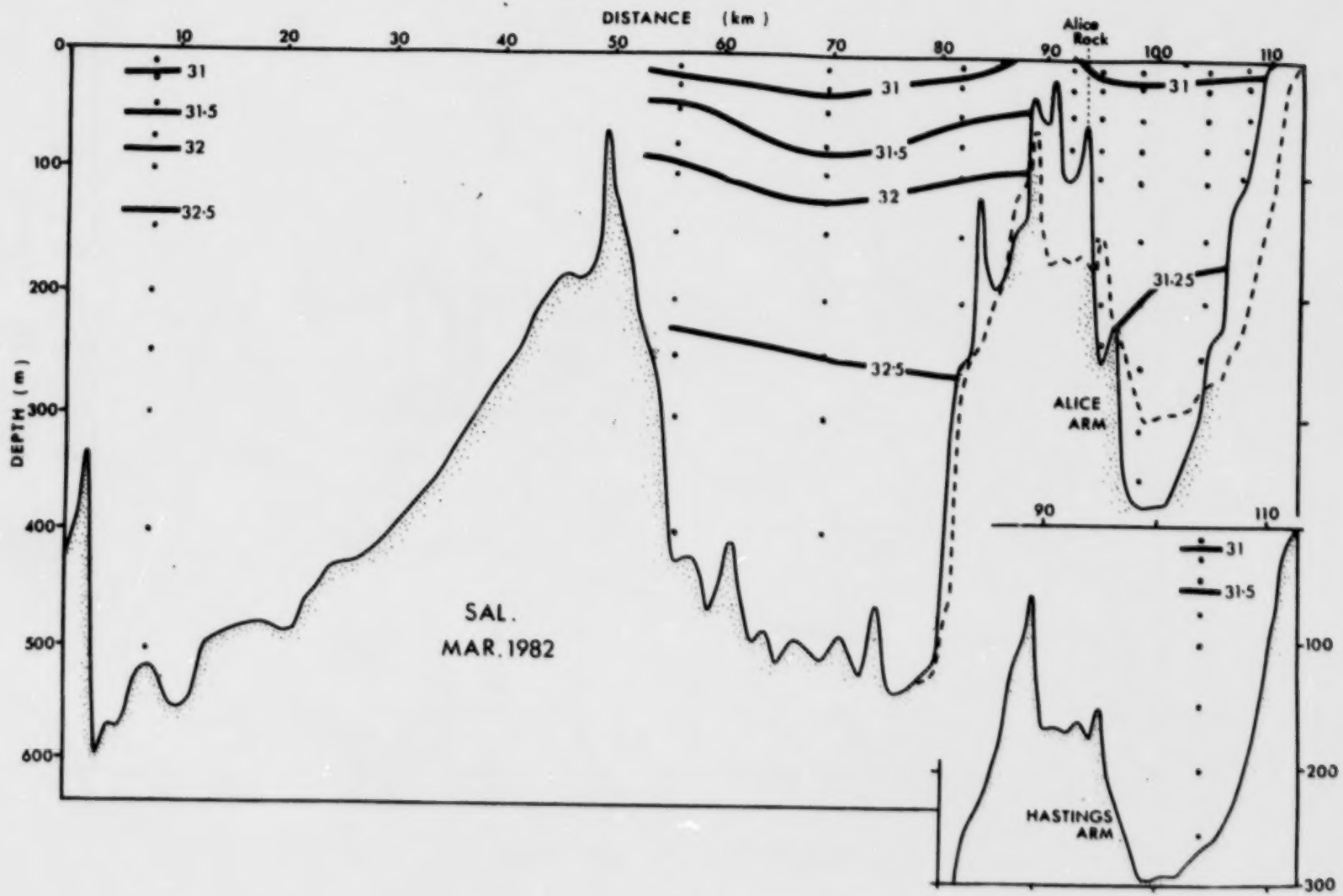
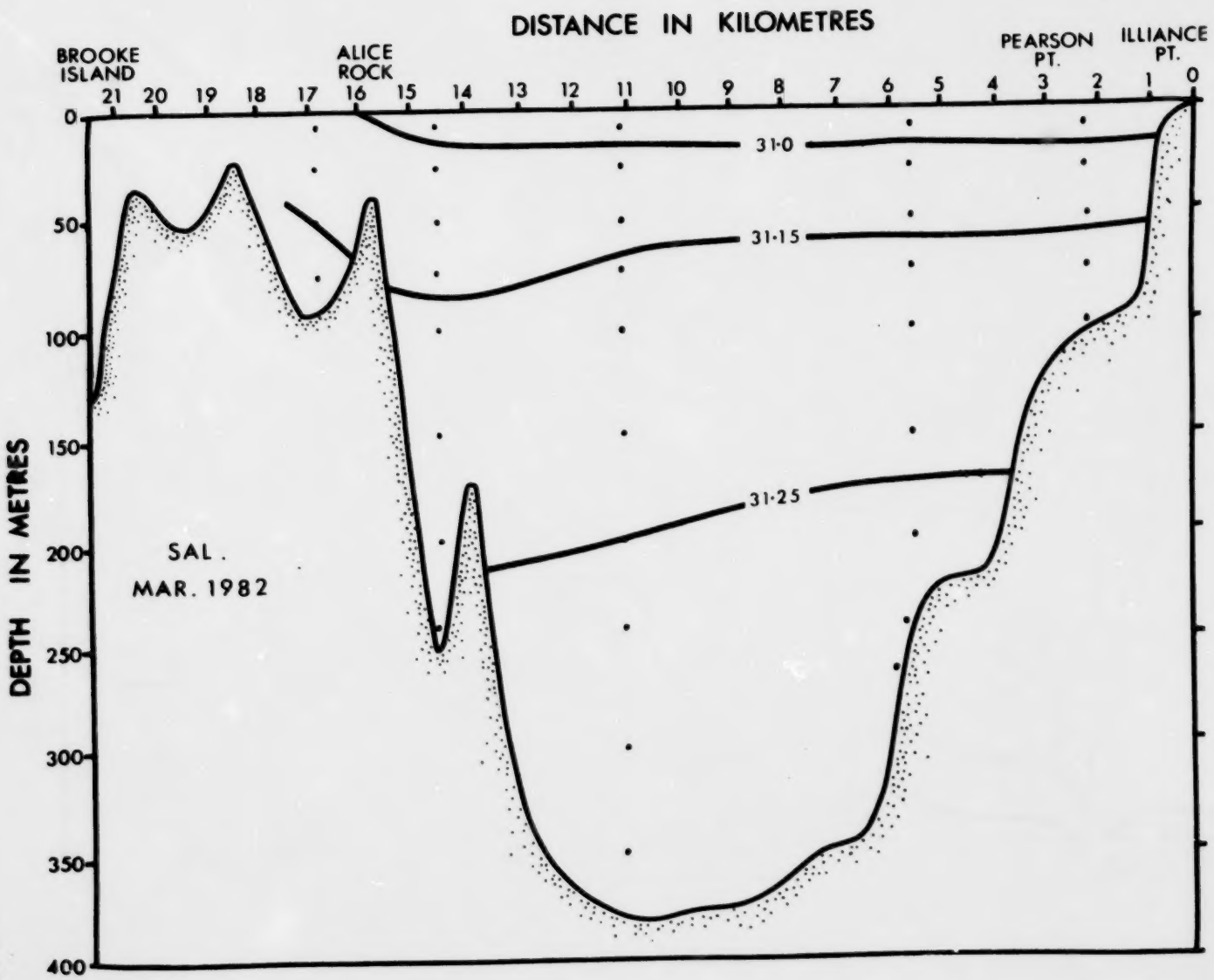
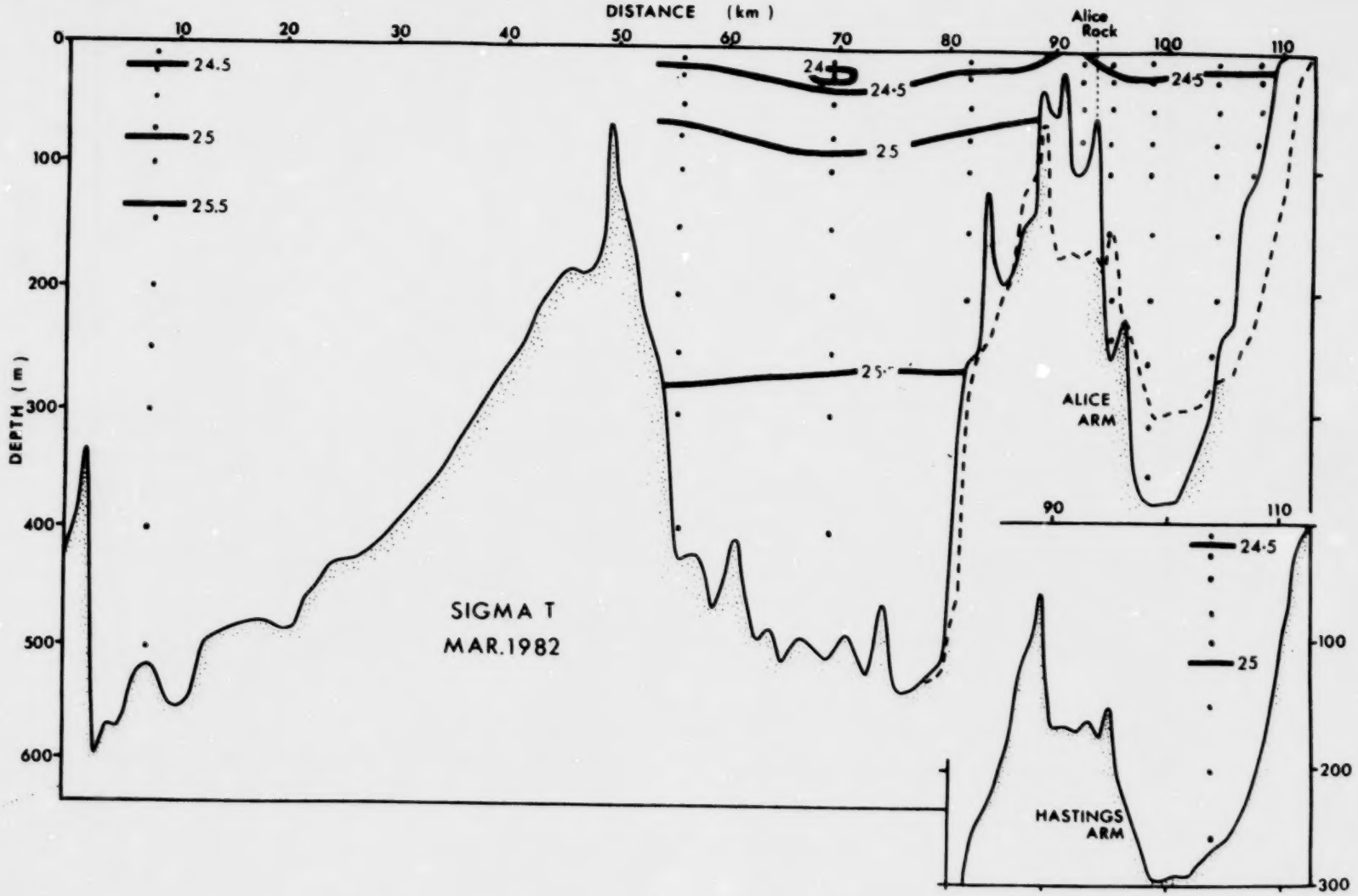
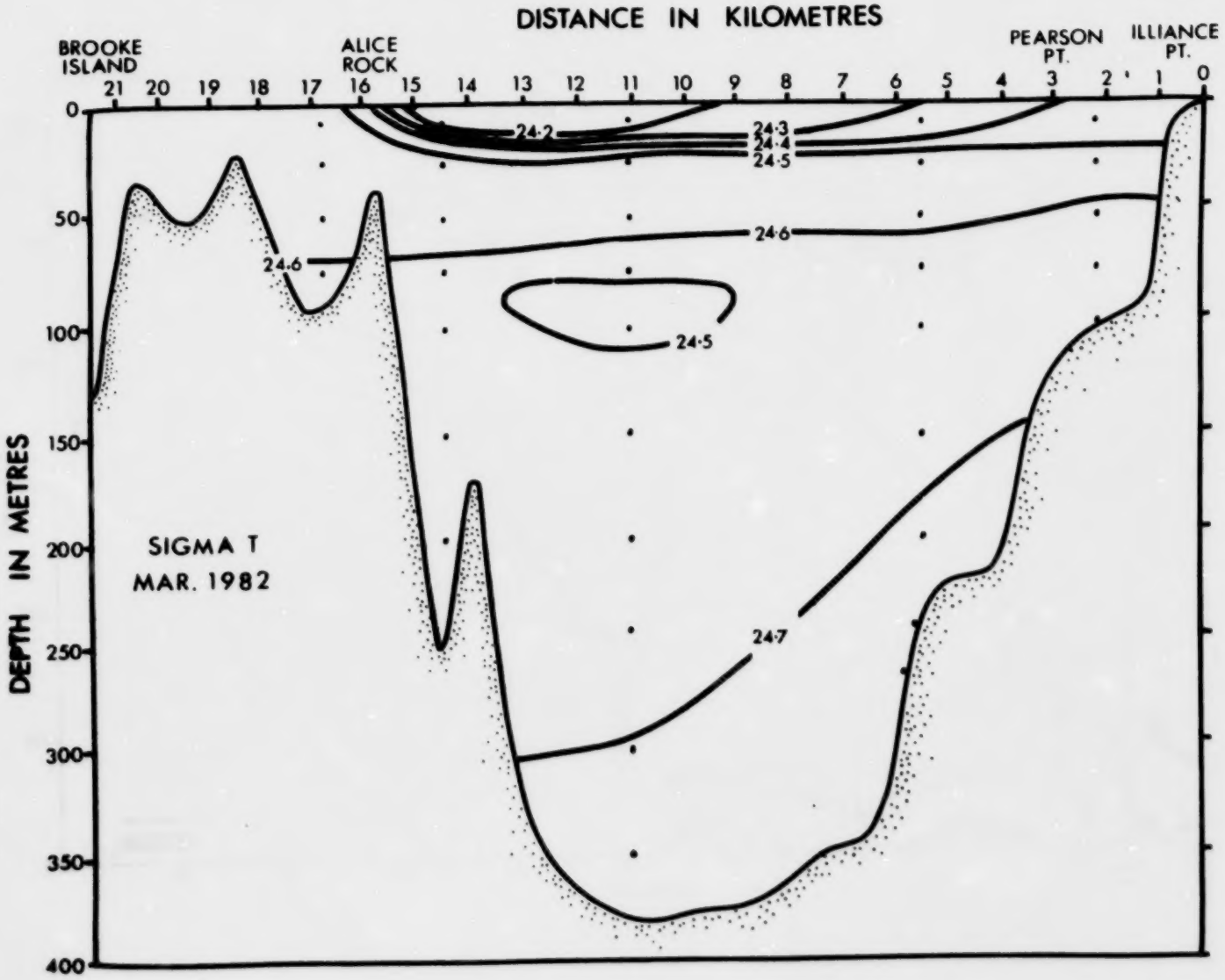
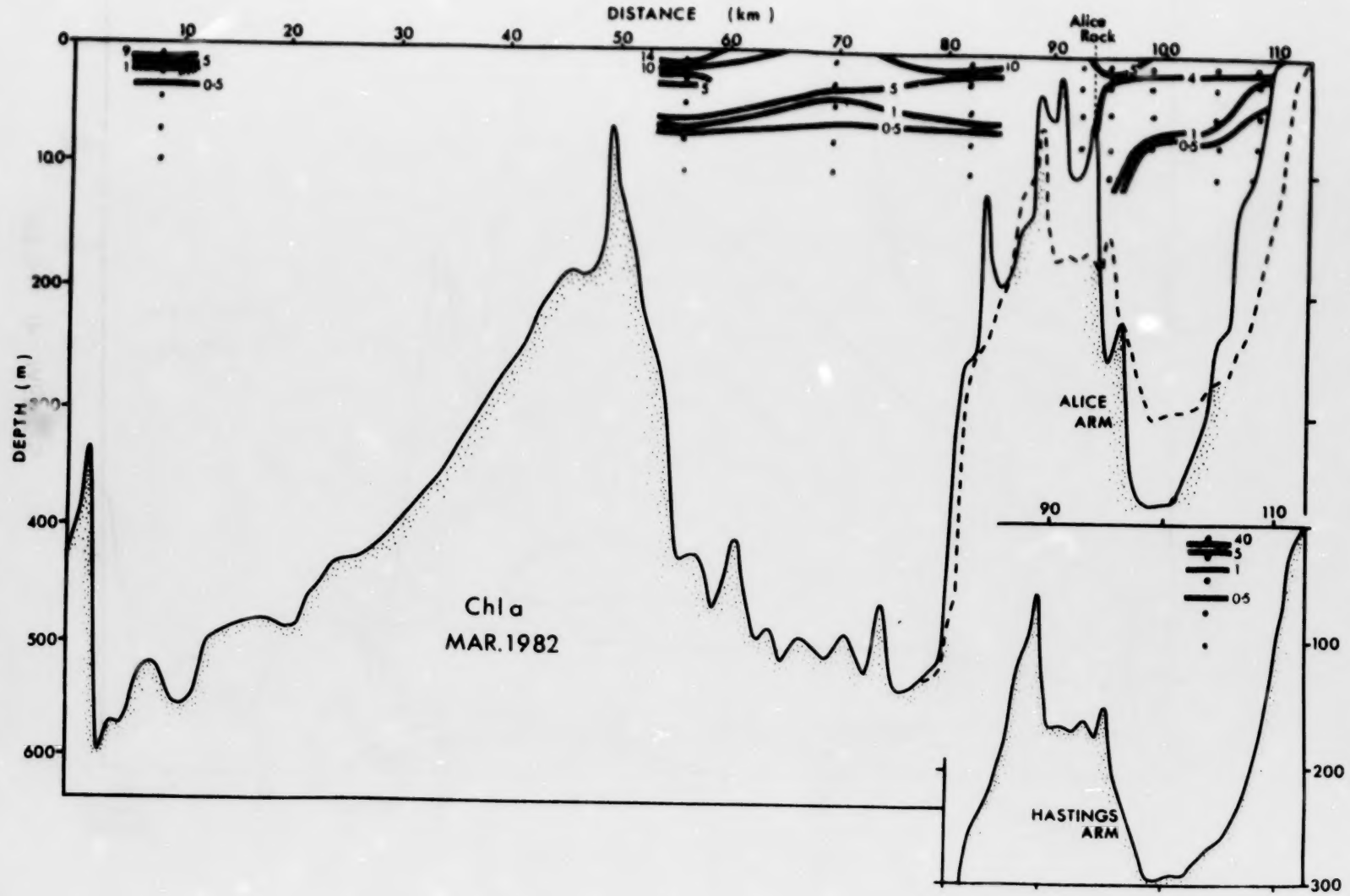
0
50
100
150
200
250
300
350
400
DEPTH IN METRES
5·4
5·5
5·6
5·4
5·3
T °C
MAR. 1982

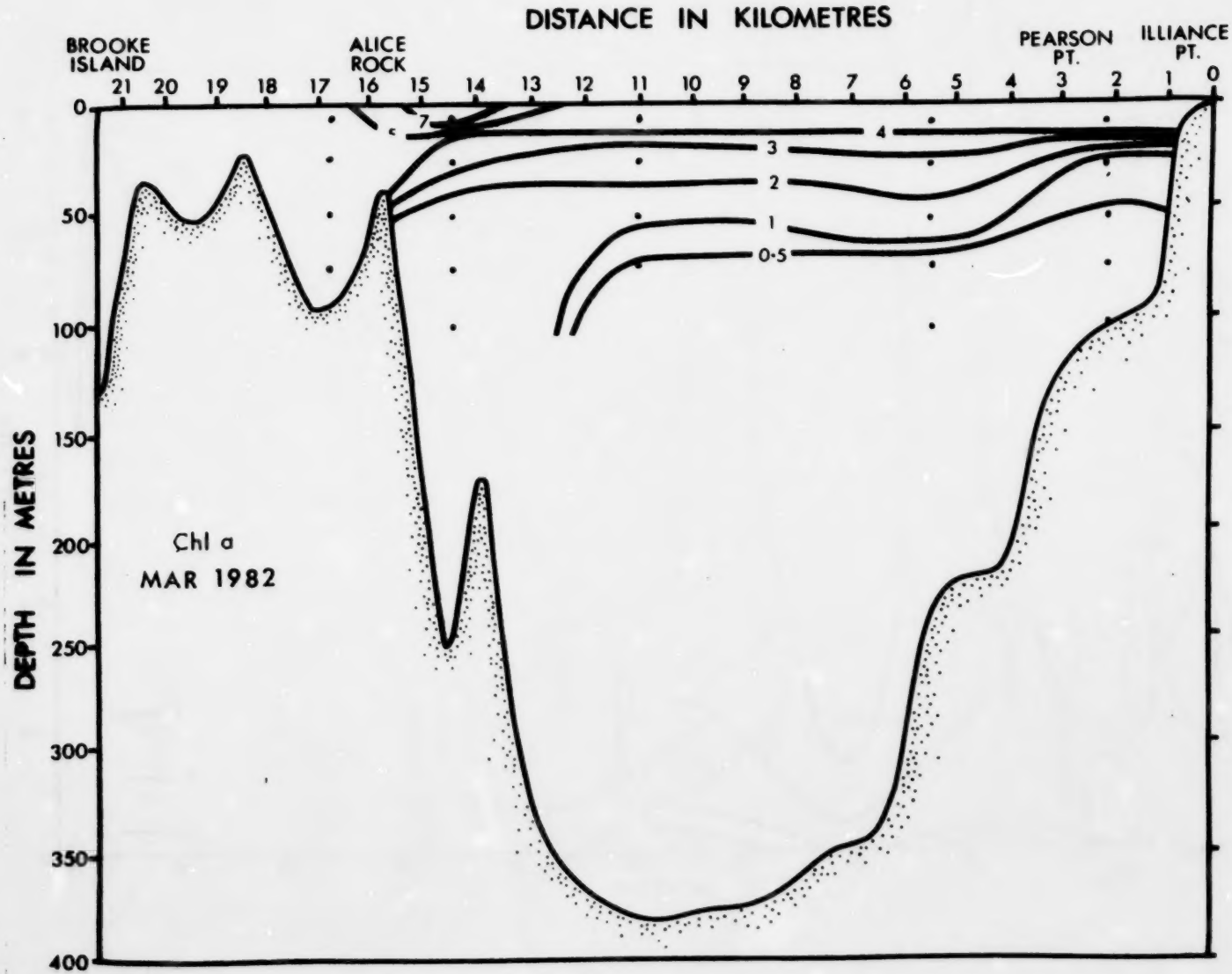

DISTANCE (km)
0
10
20
30
40
50
60
70
80
90
100
110
Alice Rock
DEPTH (m)
100
200
300
400
500
600
31
31·5
32
32·5
31
31·5
32
32·5
31
31·25
ALICE ARM
SAL.
MAR. 1982
90
110
31
31·5
100
200
300
HASTINGS ARM

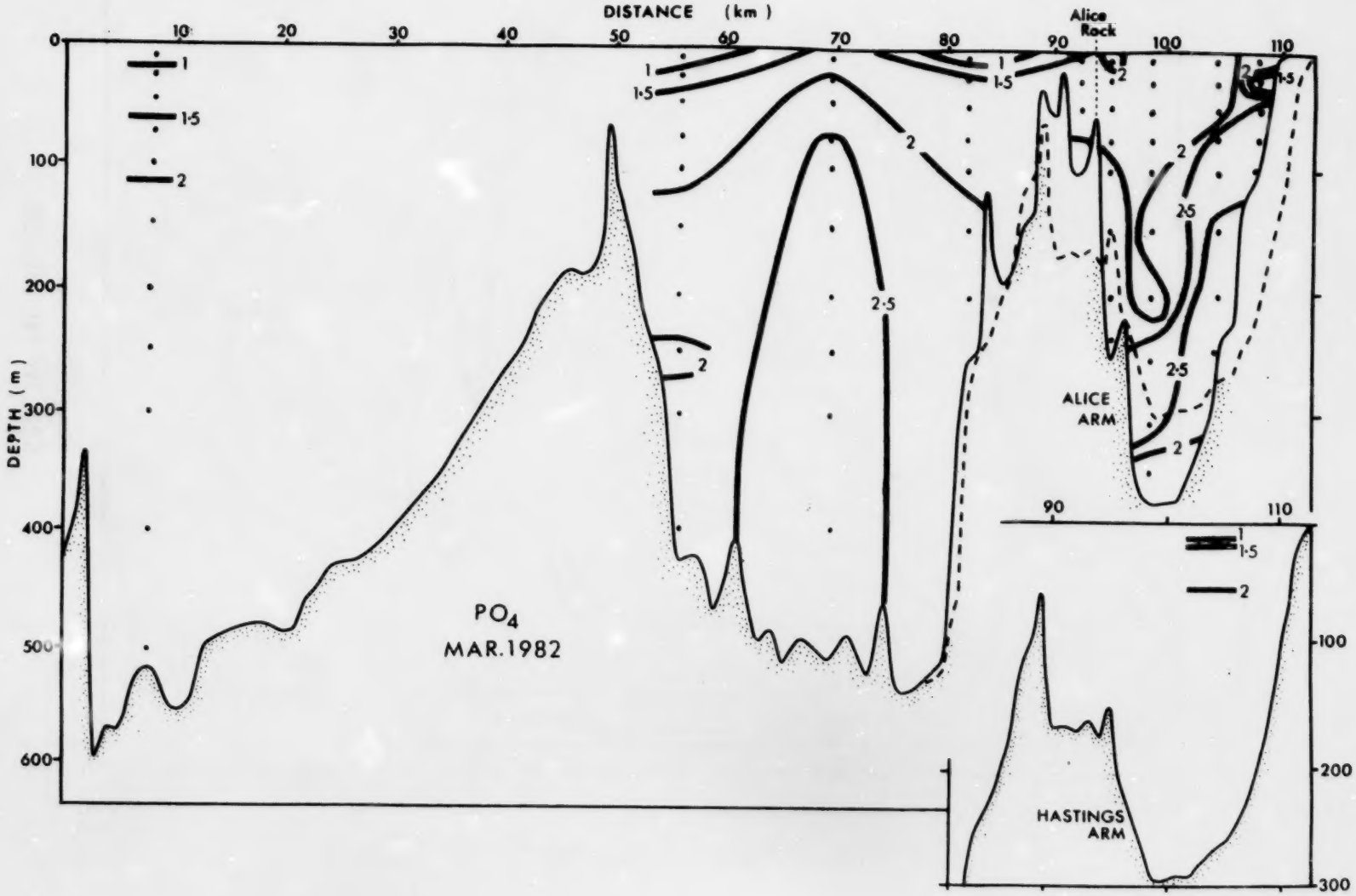

DISTANCE IN KILOMETRES
BROOKE ISLAND
ALICE ROCK
PEARSON PT.
ILLIANCE PT.
21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
DEPTH IN METRES
0
50
100
150
200
250
300
350
400
31·0
31·15
31·25
SAL.
MAR. 1982

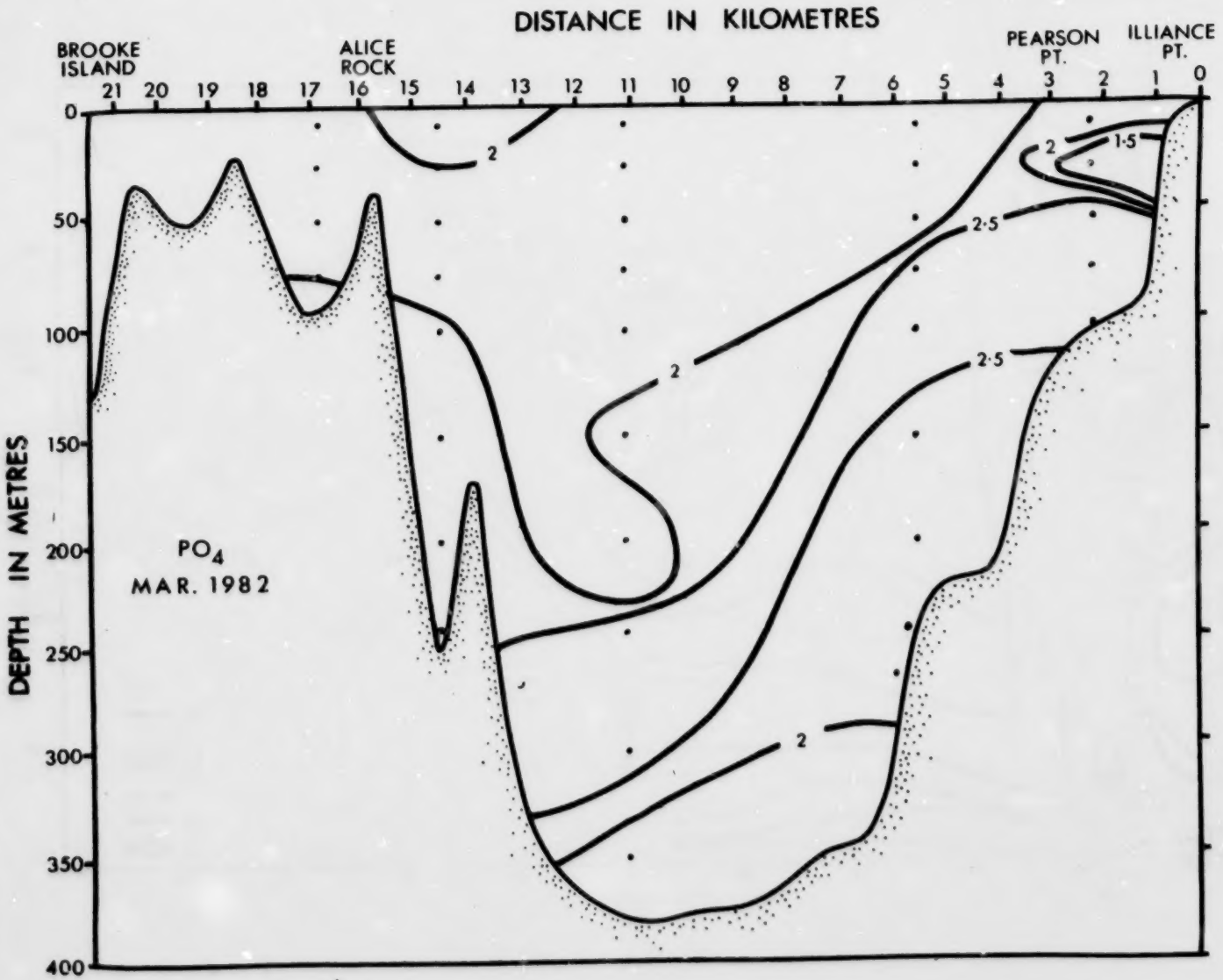

DISTANCE (km)
Alice Rock
DEPTH (m)
24.5
25
25.5
24.5
25
ALICE ARM
HASTINGS ARM
SIGMA T
MAR.1982

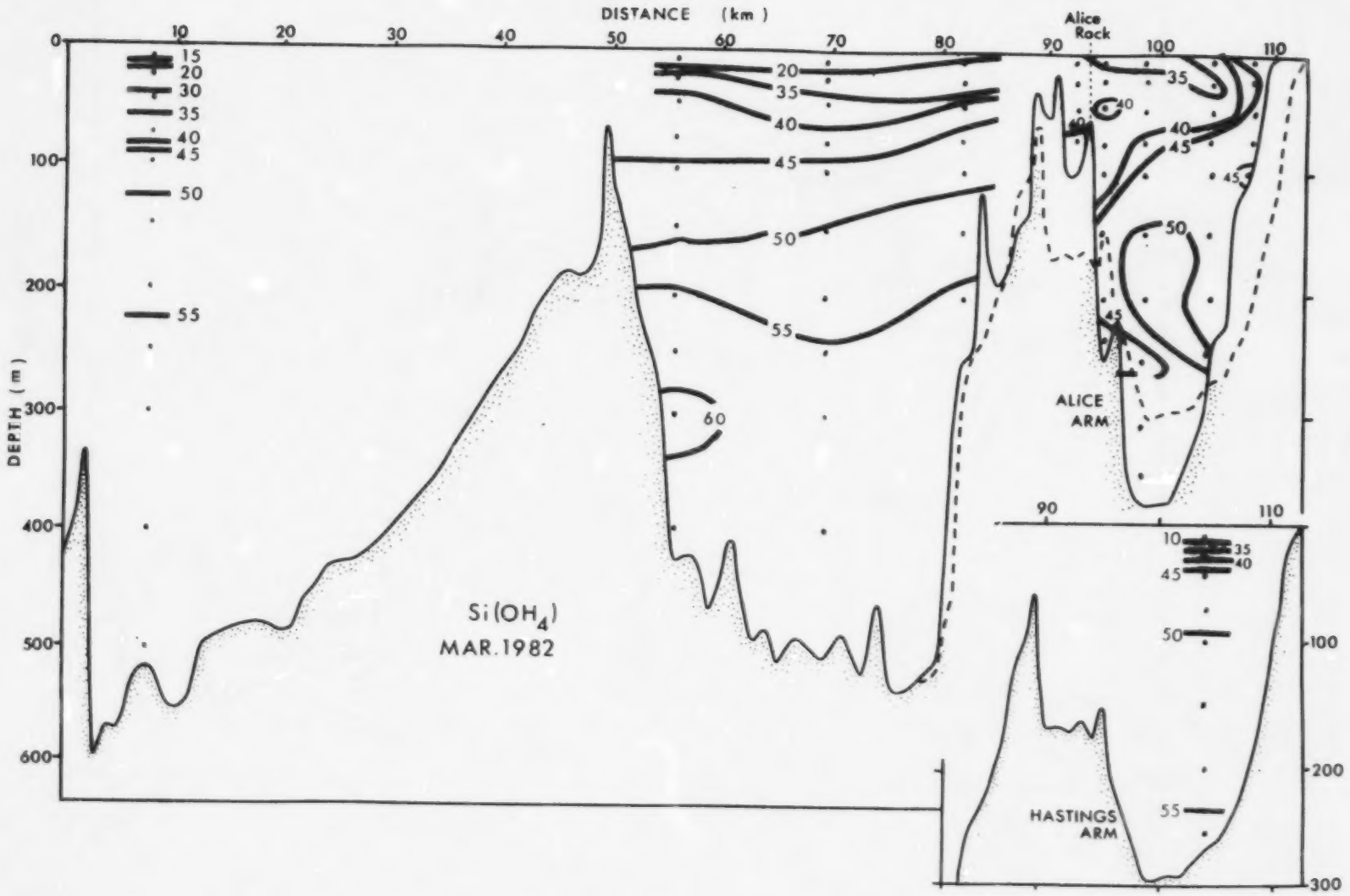

DISTANCE IN KILOMETRES
BROOKE ISLAND
ALICE ROCK
PEARSON PT.
ILLIANCE PT.
21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
DEPTH IN METRES
0 50 100 150 200 250 300 350 400
24·2
24·3
24·4
24·5
24·6
24·6
24·5
24·7
SIGMA T
MAR. 1982

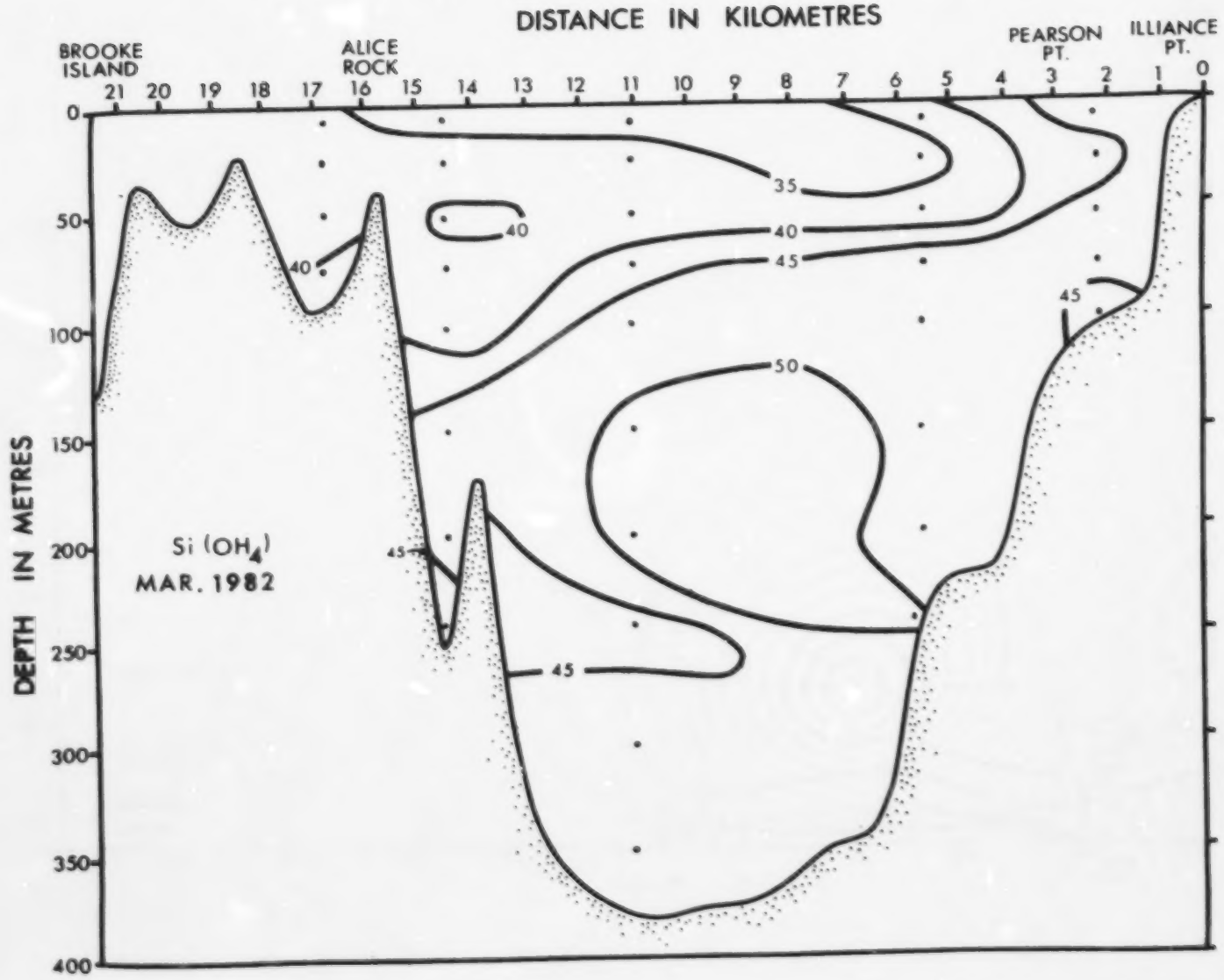

DISTANCE (km)
Alice Rock
DEPTH (m)
Chl a
MAR. 1982
ALICE ARM
HASTINGS ARM

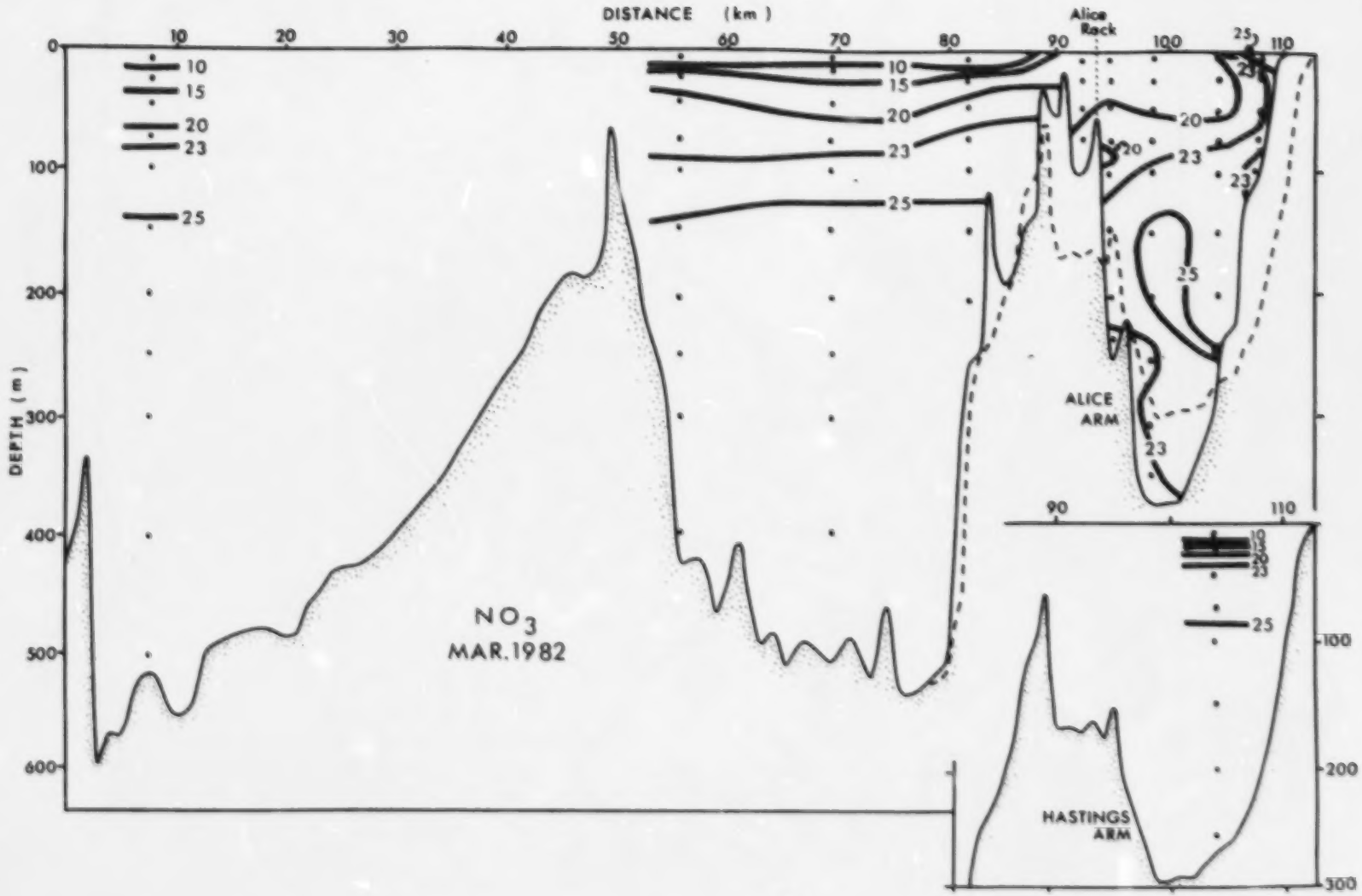

DISTANCE IN KILOMETRES
BROOKE ISLAND
ALICE ROCK
PEARSON PT.
ILLIANCE PT.
21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
DEPTH IN METRES
0
50
100
150
200
250
300
350
400
7
4
3
2
1
0·5
Chl a
MAR 1982

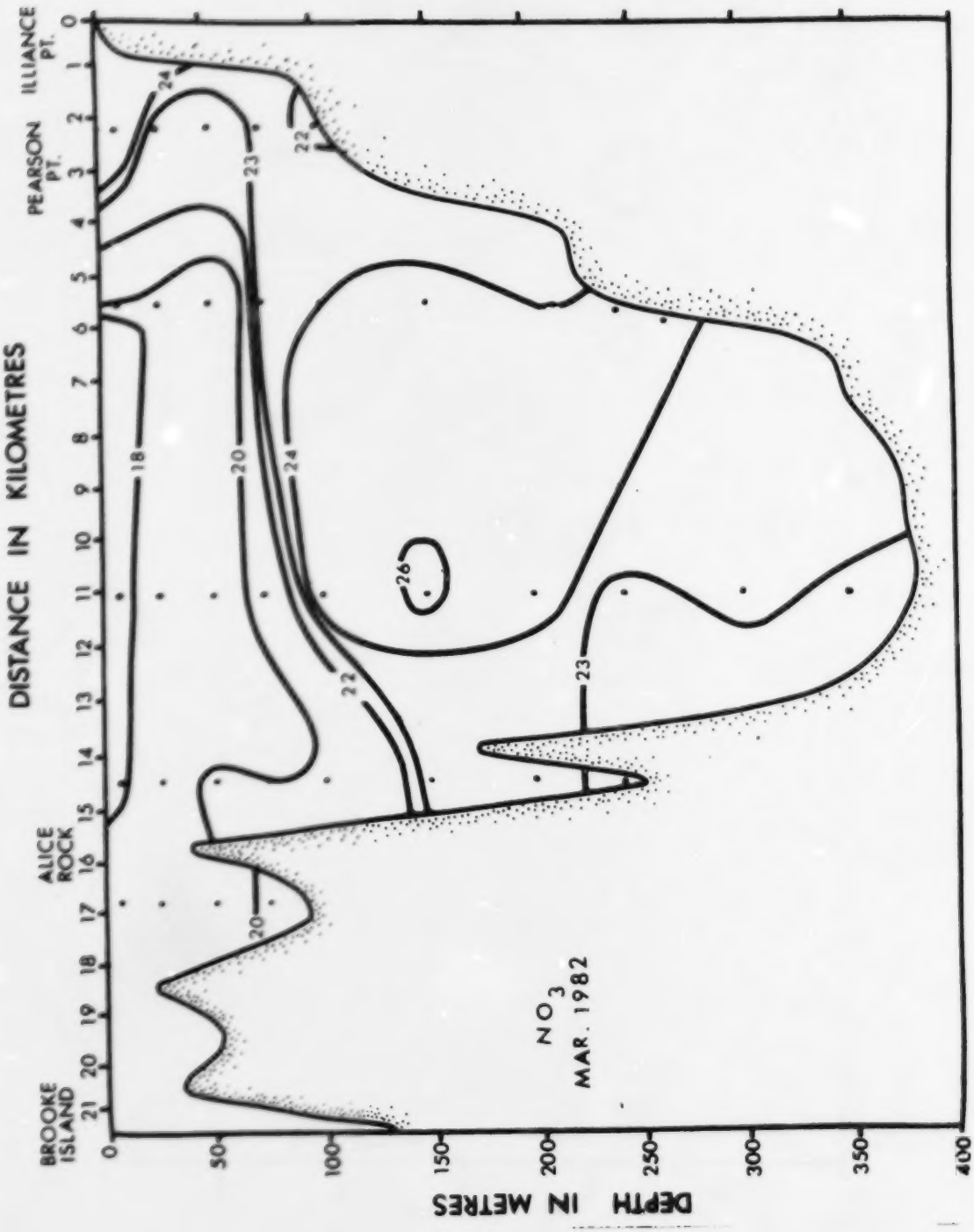

DISTANCE (km)
Alice Rock
DEPTH (m)
PO4
MAR.1982
ALICE ARM
HASTINGS ARM


DISTANCE IN KILOMETRES
BROOKE ISLAND
ALICE ROCK
PEARSON PT.
ILLIANCE PT.
21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
DEPTH IN METRES
0
50
100
150
200
250
300
350
400
2
2
1·5
2·5
2
2·5
2
PO4
MAR. 1982


DISTANCE (km)
DEPTH (m)
Alice Rock
ALICE ARM
HASTINGS ARM
Si(OH4)
MAR.1982


DISTANCE IN KILOMETRES
BROOKE ISLAND
ALICE ROCK
PEARSON PT.
ILLIANCE PT.
21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
DEPTH IN METRES
0 50 100 150 200 250 300 350 400
35
40
40
40
45
45
50
45
45
Si (OH4)
MAR. 1982


DISTANCE (km)
Alice Rock
DEPTH (m)
NO3
MAR.1982
ALICE ARM
HASTINGS ARM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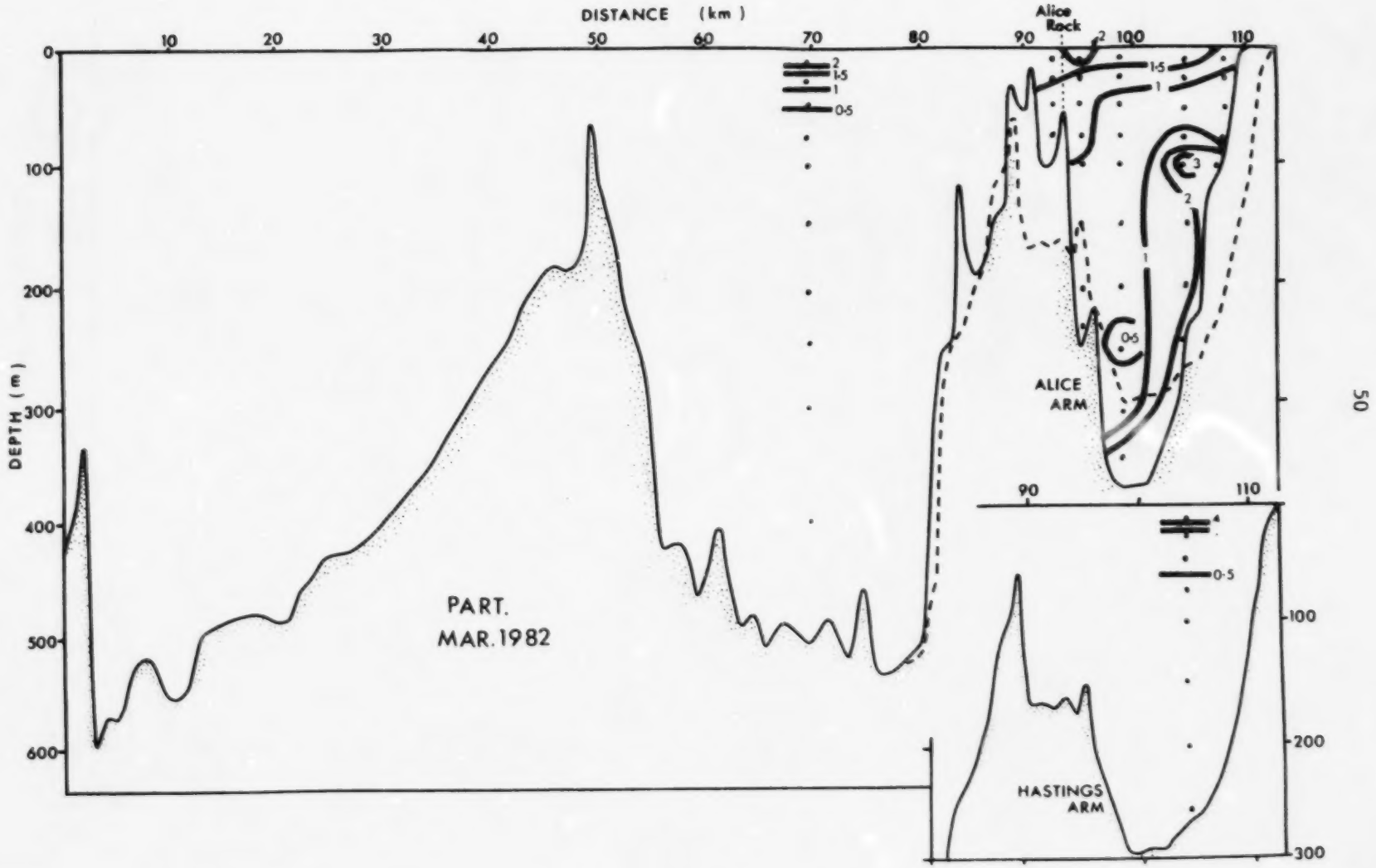
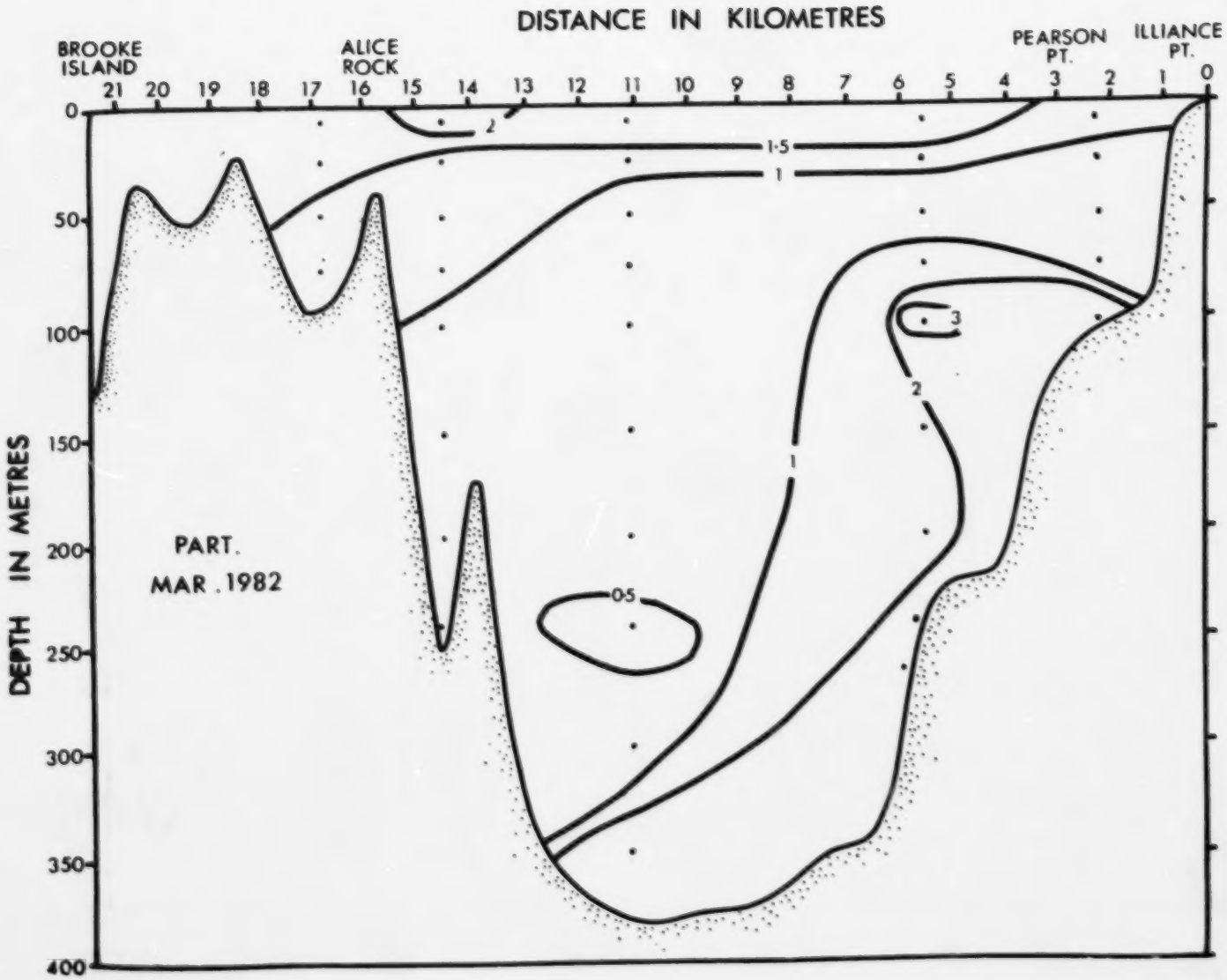
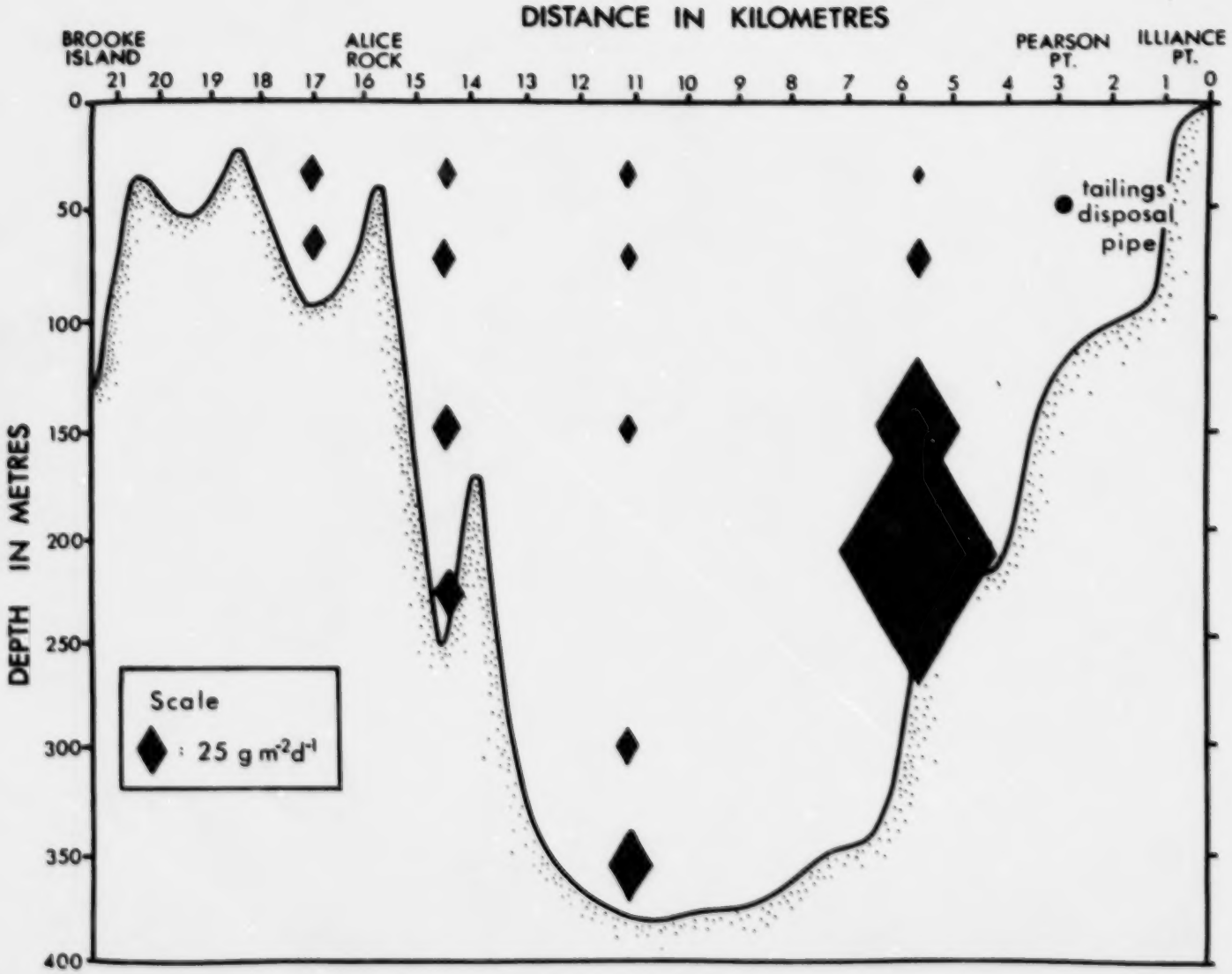
BROOKE ISLAND
ALICE ROCK
PEARSON PT.
ILLIANCE PT.
DEPTH IN METRES
NO3
MAR. 1982


DISTANCE (km)
10
20
30
40
50
60
70
80
90
100
110
Alice Rock
DEPTH (m)
0
100
200
300
400
500
600
2
1·5
1
0·5
3
2
0·5
ALICE ARM
90
110
4
0·5
100
200
300
HASTINGS ARM
PART.
MAR. 1982


DISTANCE IN KILOMETRES
BROOKE ISLAND
ALICE ROCK
PEARSON PT.
ILLIANCE PT.
21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
DEPTH IN METRES
0 50 100 150 200 250 300 350 400
2
1·5
1
3
2
1
·05
PART.
MAR . 1982


DISTANCE IN KILOMETRES
BROOKE ISLAND
ALICE ROCK
PEARSON PT.
ILLIANCE PT.
21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
DEPTH IN METRES
0 50 100 150 200 250 300 350 400
tailings disposal pipe
Scale
: 25 g m-2d-1

SEDIMENTATION in ALICE ARM MARCH '82

Ocean Chemistry Data Report: Alice Arm, Observatory Inlet; Part 3, September - October 1982

R.W. Macdonald, M.C. O'Brien, D.M. Macdonald

Institute of Ocean Sciences
Department of Fisheries and Oceans
Sidney, B.C. V8L 4B2

1984

Canadian Data Report of Hydrography and Ocean Sciences No. 17 (Part 3)

Canada

Canadian Data Report Of Hydrography and Ocean Sciences

These reports provide a medium for the documentation and dissemination of data in a form directly useable by the scientific and engineering communities.

Generally, the reports will contain raw and/or analyzed data but will not contain interpretations of the data. Such compilations will commonly have been prepared in support of work related to the programs and interests of the Ocean Science and Surveys (OSS) sector of the Department of Fisheries and Oceans.

Data Reports are produced regionally but are numbered and indexed nationally. Requests for individual reports will be fulfilled by the issuing establishment listed on the front cover and title page. Out of stock reports will be supplied for a fee by commercial agents.

Regional and headquarters establishments of Ocean Science and Surveys ceased publication of their various report series as of December 1981. A complete listing of these publications and the last number issued under each title are published in the *Canadian Journal of Fisheries and Aquatic Sciences*, Volume 38: Index to Publications 1981. The current series began with Report Number 1 in January 1982.

Rapport statistique canadien sur l'hydrographie et les sciences océaniques

Ces rapports servent de véhicule pour la compilation et la diffusion des données sous une forme directement utilisable par les scientifiques et les techniciens.

En général, les rapports contiennent des données brutes ou analysées mais ne fournissent pas d'interprétations des données. Ces compilations sont préparées le plus souvent à l'appui de travaux reliés aux programmes et intérêts du service des Sciences et Levés océaniques (SLO) du ministère des Pêches et des Océans.

Les rapports statistiques sont produits à l'échelon régional mais sont numérotés et placés dans l'index à l'échelon national. Les demandes de rapports seront satisfaites par l'établissement auteur dont le nom figure sur la couverture et la page de titre. Les rapports épuisés seront fournis contre rétribution par des agents commerciaux.

Les établissements des Sciences et Levés océaniques dans les régions et à l'administration centrale ont cessé de publier leurs diverses séries de rapports depuis décembre 1981. Vous trouverez dans l'index des publications du volume 38 du *Journal canadien des sciences halieutiques et aquatiques*, la liste de ces publications ainsi que le dernier numéro paru dans chaque catégorie. La nouvelle série a commencé avec la publication du Rapport n° 1 en janvier 1982.

Canadian Data Report of Hydrography and Ocean Sciences No. 17 (Part 3)

1984

OCEAN CHEMISTRY DATA REPORT : ALICE ARM, OBSERVATORY INLET; PART 3, SEPTEMBER - OCTOBER 1982

by

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ABSTRACT

Macdonald, R.W., M.C. O'Brien, D.M. Macdonald, 1984. Ocean Chemistry Data Report: Alice Arm, Observatory Inlet; Part 3, September-October 1982. Can. Data Rep. Hydrogr. Ocean Sci. 17 (Part 3), 110 pp.

The preliminary data from a cruise (OC-82-IS-003, Sept/Oct 1982) to Alice Arm, B.C., are reported here. Included are measurements of salinity, temperature, % transmittance, oxygen, chlorophyll a, silicate, nitrate, phosphate, particulates (filtration and Coulter Counter) and amounts of material caught in sediment traps.

Key words: Alice Arm, Data, Oceanographic

RESUME

Macdonald, R.W., M.C. O'Brien, D.M. Macdonald, 1984. Ocean Chemistry Data Report: Alice Arm, Observatory Inlet; Part 3, September-October 1982. Can. Data Rep. Hydrogr. Ocean Sci. 17 (Part 3), 110 pp.

Les données préliminaires obtenues lors d'une expedition (OC-82-IS-003, sept. -oct. 1982) au bras Alice (C.-B.) sont présentées. Celles-ci comprennent des mesures de la salinité, de la température et du pourcentage de transmission et des dosages d'oxygène, chlorophylle a, silicate, nitrate, phosphate, matières particulaires (filtration et numération Coulter) et de matériaux recueillis dans des pièges à sédiments.

Mots clés: Bras Alice, données, océanographie

ACKNOWLEDGEMENTS

We thank D. Paton and M. Paryniuk for assisting in sample collection and processing during the cruise. We are indebted to the Officers and Crew of C.S.S. Vector for their complete cooperation and assistance. The manuscript was prepared by C. Priestley, and some of the figures by P. Frank.

INTRODUCTION

As part of an investigation of the transport and fate of mine tailings disposed in a coastal fjord, Ocean Chemistry conducted two cruises to Alice Arm, Hastings Arm and Observatory Inlet. During these cruises the water column and sediments were sampled, and sediment traps were deployed and recovered in Alice Arm. During another two cruises organized by Coastal Zone Oceanography, we deployed and recovered sediment traps in Alice Arm. Additionally, nutrient samples were collected during two other Coastal Zone Oceanography cruises. The background and preliminary data from these cruises are reported in three parts as follows:

Part 1. December 1981, CZO Alice Arm Cruise 02 (nutrients)
January 1982, CZO Alice Arm Cruise 03 (nutrients)
June 1982, CZO Alice Arm Cruise 05 (nutrients, sediment traps)
January 1983, CZO Alice Arm Cruise 08 (sediment traps)

Part 2. March 1982, Ocean Chemistry Cruise OC-82-IS-001 (nutrients, particulates, trace metals, sediment traps)

Part 3. September-October 1982, Ocean Chemistry Cruise OC-82-IS-003 (nutrients, particulates, sediment traps, sediment cores)

Reported here in Part 3 are the sampling methods and preliminary data from the September-October 1982 cruise. We do not report results for all determinations which have been or will be performed on the material caught in sediment traps or from coring. Rather this data report is intended to be a source document for the interpretation of the more specialized data as they become available. To that end we include detailed information on sampling locations and times, sampling technique and analytical methods for the data presented here. Furthermore, we list the results of such water column measurements as salinity, temperature, dissolved oxygen, nutrients (reactive silicate, orthophosphate and nitrate plus nitrite), particulate concentration and size distribution, and the mass of material caught in the sediment traps.

SAMPLING STATIONS

We have used the same sampling stations and terminology as used by Coastal Zone Oceanography. To avoid conflict, we placed our sediment traps near but not exactly at four of the regular stations in Alice Arm; ST-1 (AA-1), ST-2 (AA-2), ST-3 (AA-3), ST-4 (AA-4). Stations are shown in Figure 1(a) with exact coordinates listed in the tables. For the CTD-ZT casts we have used the same grid and terminology as used by Environmental Protection Service. Figure 1(b) shows the sampling grid. The arrangement of sediment traps in longitudinal section is shown in Figure 2.

SAMPLING METHODS

Sea Water

Samples for particulates were collected in 5 L PVC Niskin bottles in which the neoprene rubber closure spring was replaced with a teflon coated stainless steel spring. Bottles were lowered on a standard hydrowire. Once tripped and recovered, the bottles were subsampled as follows.

Using plastic gloves, two small aliquots were drawn into an acid cleaned 5 L carboy to rinse it. With the aid of a large acid cleaned polyethylene funnel, the remaining contents of the 5 L Niskin bottles were drained into the 5 L carboy by opening the bottom cap and allowing the sea water to pour out. The contents of the carboy were then subsampled (with gentle mixing to keep particles suspended) as soon as possible in the ship's lab for particulates (filtration and Coulter Counter), chlorophyll *a*, microscopic examination and salinity.

Samples for oxygen, nutrients, salinity and temperature were taken during a second cast with 1.7 L PVC Niskin bottles armed with paired reversing thermometers. The same set of depths was used for both casts. Samples were taken as follows:

1. Oxygen samples were drawn first into 125 mL calibrated oxygen bottles which were pickled immediately and sealed (Ocean Chemistry Methods, 1976).

2. Salinity samples were drawn into 260 mL glass bottles.

3. Nutrient samples were drawn into 2 glass and 2 plastic screw-cap test-tubes (~15 mL) after 3 rinses. Nutrient samples were immediately transferred to a chest freezer where they were frozen in an upright position and later transferred to zip-lok bags which were stored inside a dark green plastic bag.

4. Temperature was measured with paired reversing thermometers read twice to the nearest $0.01C^{o}$.

Subsampling of 5 L Carboy

The exact methods of subsampling and sample handlings are identical to those described in Part 2. Salinity samples were drawn as described above. Comparison of salinity measurements made on the 5 L carboy and those determined from the 1.7 L Niskins (generally collected one half to two hours apart) showed that for the deep water the pooled standard deviation was $s_p = \pm 0.01$ (n = 17). The variance increased monotonically as depth decreased; at 100 and 75 m $s_p = \pm 0.03$ (n = 14), at 25-50 m $s_p = \pm 0.05$ (n = 16) and at 5 m $s_p = \pm 0.13$ (n = 8). We believe this can be explained as follows. In the deep water, where gradients and temporal variation in salinity are low we obtain variation inherent in the method (i.e. ± 0.01). As one approaches the surface, vertical and horizontal water motions cause salinity changes within a time period of hours and therefore cause the observed increase in variance.

Sediments

Sediments were collected with a Benthos gravity corer (118 kg). The corer was used without the barrel, the plastic tube (inside diameter 6.8 cm) being connected directly to the fin/weight assembly with a plastic adapter and stainless steel hose clamps. A one-way valve (Benthos) was attached to the top of the tube to help hold the core during recovery. We did not find it necessary to use a core cutter or catcher and were able to obtain a less disturbed core without these. The corer was allowed to hit bottom at a descent rate of 0.5 ms^{-1}. Cores were capped immediately, labelled and wrapped in Al foil. They were stored upright on deck until returned to the shore laboratory where they were kept in a dark cooler (4°C) in the upright position. Cores were extruded and cut using a specially designed extruder (Kemp et al, 1971), and the core sections were stored frozen in Whirl-Pak bags, until analyses.

Sediment Traps

The design and characteristics, and method of deployment are fully described in Part 1. Here we note only the aspects which are pertinent to this cruise.

As before, the sediment traps were placed in paired configuration, one of each pair (a side) being poisoned with sodium azide. Both sides contained a dense solution (5% NaCl) in the sample cup. Concentration of azide and methods of handling are given in Part 1.

Subsampling of Sediment Traps

After recovery, the traps were closed with their plastic lids and stored in wooden boxes on the deck. The trap contents were allowed to settle overnight before subsampling. Subsampling was carried out in the ship's laboratory (Oct. 4-6) inside specially constructed enclosures (using plastic sheeting) which were ventilated with filtered air. Trap contents were handled by personnel wearing one piece plastic lab overalls, hair caps and plastic gloves. Trap contents were first transferred to 1 L acid cleaned polybottles using some of the clear water from above the cup for rinses. The polybottles were placed in a dark cooler at 4°C until they could be completely subsampled. The contents of the polybottles were subjected to a scheme similar to that described in detail in Part 1. After determining total volume and sieving the contents of the polybottle through a 333 μm sieve;

1. a sample was taken for chlorophyll *a* (see Part 1)

2. a sample was taken for microscopy (see Part 1)

3. material from the a side (poisoned with NaN_3) for all depths from Station ST-1, ST-2, and ST-4 (except 150 m) and from both a and b sides from all depths at ST-3 was passed through a 64 μm sieve. The 64-333 μm material was washed off the sieve with pH 8 Mill-Q water, and approximately

one fifth (by volume) was decanted for POC, PON determination, filtered through a GF/C filter which was rinsed, folded, wrapped in Al foil and stored frozen. The remaining material was filtered through an acid cleaned, pre-weighed, 0.4 μm, 47 mm nuclepore filter. This was stored frozen in a petri-slide and returned to the lab for dry weight and metal determinations.

The less than 64 μm portion was subsampled for POC, PON by filtering approximately 80 mL of the sample. The remaining sample was divided into polyethylene graduated cylinders, and filtered through pre-weighed, acid cleaned 0.4 μm 47 mm nuclepore filters. These were rinsed with 3 x 10 mL of pH 8 Milli-Q water plus several small rinses around the outer edge of the filter after the castle was removed. The filters were stored frozen in petri-slides and returned to the lab for analyses.

4. For the other trap (side b, unpoisoned, ST-1, ST-2, ST-4 (except 150 m)) the contents of the polybottles were not further sieved but subsampled directly for POC, PON and metals. About 25 mL were used for the POC, PON determination and the remaining sample was divided into graduated cylinders and filtered as described in 3 above.

5. The material from the traps at Station 4, 150 m was sieved through 500 μm, 333 μm, 202 μm and 64 μm acid cleaned nitex screens. The procedures for obtaining POC, PON and metal samples for each of the various size fractions were the same as described above. The chlorophyll a and microscopic samples were taken from the less than 333 um fraction.

Figure 3a, b shows schematically the splitting process for the sediment trap materials for this cruise.

During this cruise, many of the traps contained gelatinous material which hindered the sieving process, particularly through the 333 μm screen. As a result some material less than 333 um was tied up in the gelatinous slime which stuck to the sieve. To correct this problem, the greater than 333 um material was resieved in the lab and the total weights corrected for this material (Table 6(b)).

ANALYTICAL METHODS

Analytical methods have been previously described (Parts 1 and 2) and only a very simple account is given here.

Oxygen

Oxygen was determined as described in Part 2. Accuracy and precision were not evaluated during the cruise, except that calibration replication and blank determinations were within the documented limits (Carpenter, 1965).

Salinity

Salinities were determined as described in Part 2. Instrumental precision was determined as pooled variance ($s^2_p = \frac{1}{2n} \Sigma\Delta 2$) of 120 duplicate conductivity determinations and is reported in Table 1. Comparison between deep water samples (greater than 100 m) obtained independently within one half to two hours of each other gave a pooled standard deviation of ± 0.01 (n = 17).

Particulates, Dry Weight

Filters were dried and weighed as described in Part 2. For this cruise we found blanks to be $\bar{B} \pm s$ (n) = 0.44 ± 0.028 mg (8). This corresponds to a detection limit (d.l. = 3 s_B) of 0.08 mg and a quantification limit (q.l. = 10 s_B) of 0.28 mg. Sample volumes filtered were normally about 2 L, and thus d.l. = 0.04 mg L^{-1}, q.l. = 0.14 mg L^{-1}. If we assume variance of the sample to be approximately equal to variance of the blank, the overall standard deviation of a blank corrected sample is approximately $\sqrt{2}\ s_B$ = 0.04 mg or 0.02 mg L^{-1}. For the concentration of particulates found during this cruise, this corresponds to a percent coefficient of variation $\leq$ 6%. This estimate appears reasonable when compared to a detailed study we conducted to examine precision of the method (Macdonald et al, 1983).

To examine accuracy of the filtration technique, we prepared some standard solutions in the laboratory as follows. About 20 L of Saanich Inlet water was filtered (0.4 μm) and three suspensions prepared; 2.2 mg L^{-1}, 6.1 mg L^{-1} and 24.4 mg L^{-1}. The suspensions were made from Alice Arm surficial sediment which had been washed of salt, freeze dried, sieved through a 64 μm screen and weighed to the nearest 0.1 mg. Each suspension was made up in a 4.5 L container which was stirred during subsampling. Subsamples were taken from a bottom spigot. A container with filtered sea water was used for blank determinations. Filtration, filter rinsing and drying were carried out as previously described. Five independent determinations were run with the following results. Coefficients of variation were all less than 5%. Recovery of materials in suspension was 93.5 ± 1.5% for the three suspensions. A determination of particle size distribution showed that about 26% was less than 0.45 μm. Therefore it is likely that some material passed the filter. However, it is equally obvious that the filters captured material with a nominal size less than the filter pore size. While the method does give reasonable precision, absolute accuracy cannot be defined and suspended matter is operationally defined by what does not pass the 0.4 μm filter under the filtration conditions. From the above it appears that capture of particulate is almost quantitative.

Chlorophyll a

Samples were determined with a Turner Design Fluorometer by the fluorometric method described by Strickland and Parsons (1972). Detection limits and precision achievable are reported in the reference but have not been evaluated for the data reported here.

Coulter Counter (particle size distribution and volume)

Samples were analyzed with the TA II Coulter Counter with a 200 μm aperture tube as described in Part 2. Calibration was carried out with 9.69 um polystyrene beads and 27.3 μm Lycopodium pollen. Based on the pooled variance of deep water samples (n = 24) we estimate the coefficient of variation for samples with the lowest particle counts to be less than 10%. Agreement between replicates which were run from time to time was always better than this.

Nutrients

Nutrients were run as described in Part 1. Precision was evaluated using blind replicates (see Part 1). The pooled estimate of standard deviation is reported in Table 1, and replicates are shown in the data tables.

Sediment Trap Materials (dry weight)

Methods of dry weight determination are fully described in Part 1. Estimated error based on this data set is reported in Table 1.

CTD %T

Data were obtained with a Plessey 1400 CTD coupled with a Seatech transmissometer.

We compared the data obtained from this instrument with those obtained during the subsequent bottlecast. We found that the variance of the difference between the two determinations decreased with depth. Below about 75 m, the variance remained constant and we have used these data to determine the bias of the instrument relative to salinities determined back at the laboratory. Where $\Delta = (\text{Salinity}_{CTD} - \text{Salinity}_{laboratory})$ we found $\Delta \pm s\ (n) = 0.055 \pm 0.027\ (25)$. Given that the standard deviation of the laboratory determination is about 0.01, the variance of the CTD for salinity may be estimated as:

$$s^2_{CTD} + s^2_{laboratory} = s^2_{total}$$

where s^2_{total} can be estimated from the variance of the calculated Δ. Therefore the instrumental error works out to about $\pm$ 0.025. Similarly for temperature, the CTD reads slightly low relative to the reversing thermometers; $\Delta \pm s\ (n) = -0.051 \pm 0.029$ (36). We estimate the standard deviation for the temperature channel to be $\pm$ 0.027 C^o.

The transmissometer made by Seatech, had a 25 cm pathlength with an LED light source (660 mm). Instrumental parameters are given in the manual and have been evaluated in the field (Bartz et al, 1978). For a well collimated monochromatic light in a scattering or absorbing medium, the light lost in transit is given by

$$\frac{\%T}{100} = e^{-cr}$$

where %T is percent transmittance, r is the pathlength (0.25 m) and c is the attenuation coefficient (m^{-1}). For our instrument

$$c = 4 \ln \frac{100}{T}$$

An important result of this equation is that the accuracy is best near the region cr = 1. The instrument is pre-calibrated at the factory by setting attenuation of distilled filtered water at 91.3%. During use the calibration is checked by measuring the reading in air prior to each cast. We found a reading of 1410-1411 H_z (94.5-95.0 %T) could always be obtained with adequate window cleaning. The manufacturers suggest that the greatest sensitivity can be achieved in clear water where changes of 0.1 mg L^{-1} can be detected. In Turbid water (0.5 %T) approximately 4 mg L^{-1} changes can be detected. We calibrated the instrument in the field by obtaining samples of water (1.7 L Niskin) in the water column where gradients in particulate concentration were not too great. We found the following:

$$y - y_b \ (\text{mg } L^{-1}) = a + m\,(c - c_w)$$

where y_b = 0.40 mg L^{-1} is the background particulate concentration, and c_w = 0.72 (1433 H_z) the background reading for clear water. For the 15 data points, m = 5.22 $\pm$ 0.52 (95% confidence), a = -1.11 $\pm$ 0.93, and R = 0.986. This calibration is different than that obtained by Baker (1982) for a similar transmissometer but this should not be surprising since it was obtained over a much larger range of particulate concentrations and for different material. Fig. 4 shows the calibration curve for this cruise.

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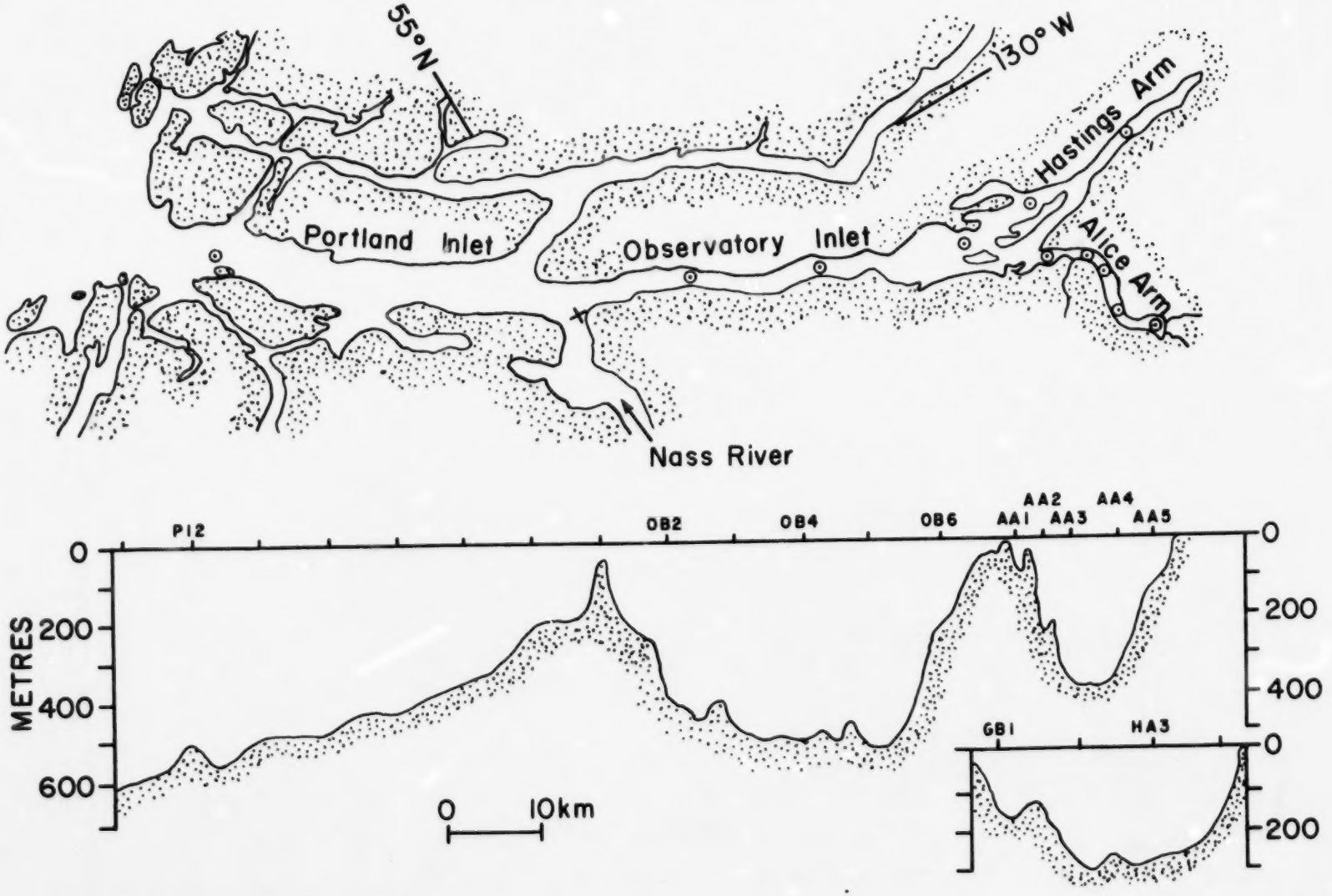


Fig. 1. Station locations

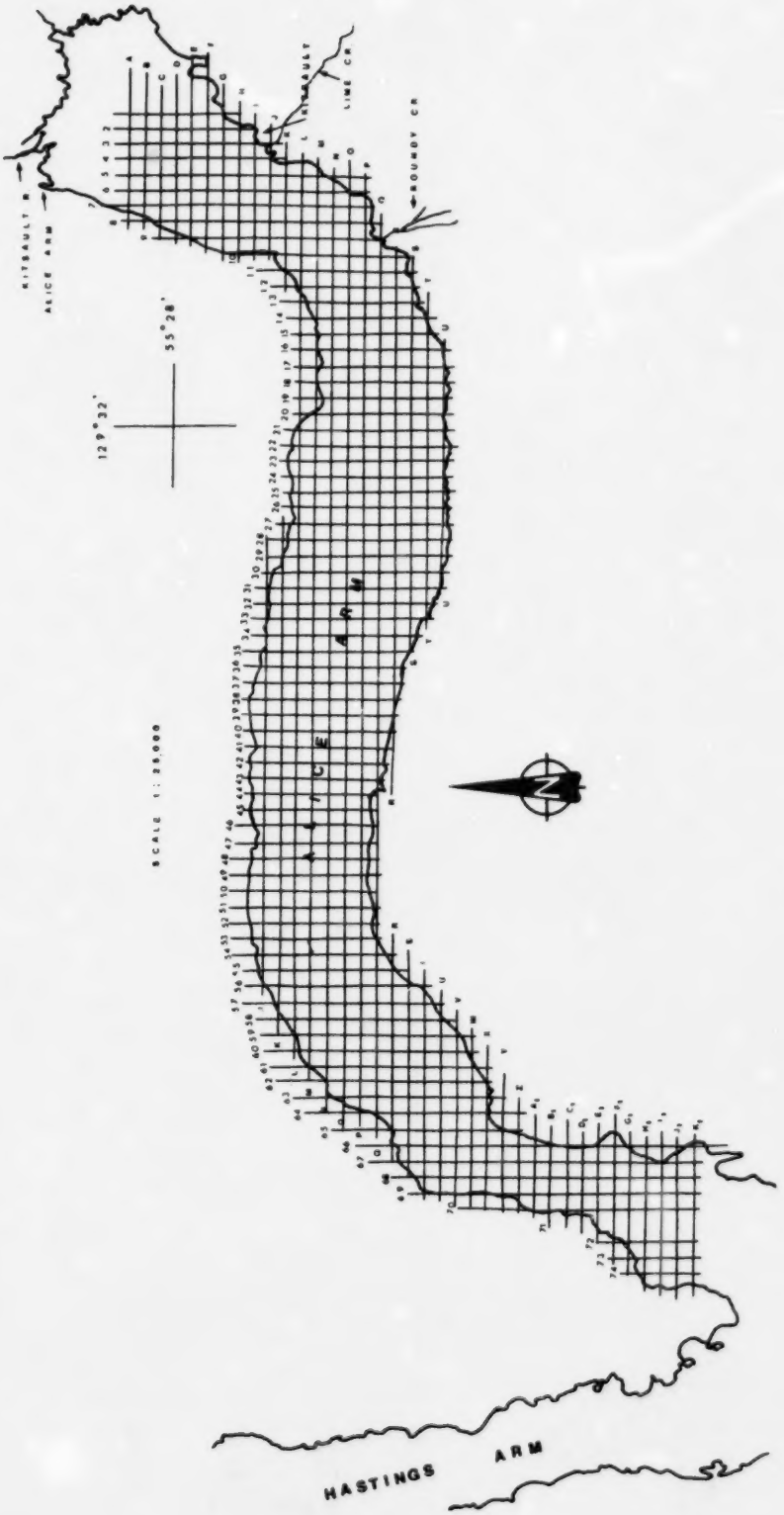


Fig. 1(b). Sampling grid used for CTD&T profiles

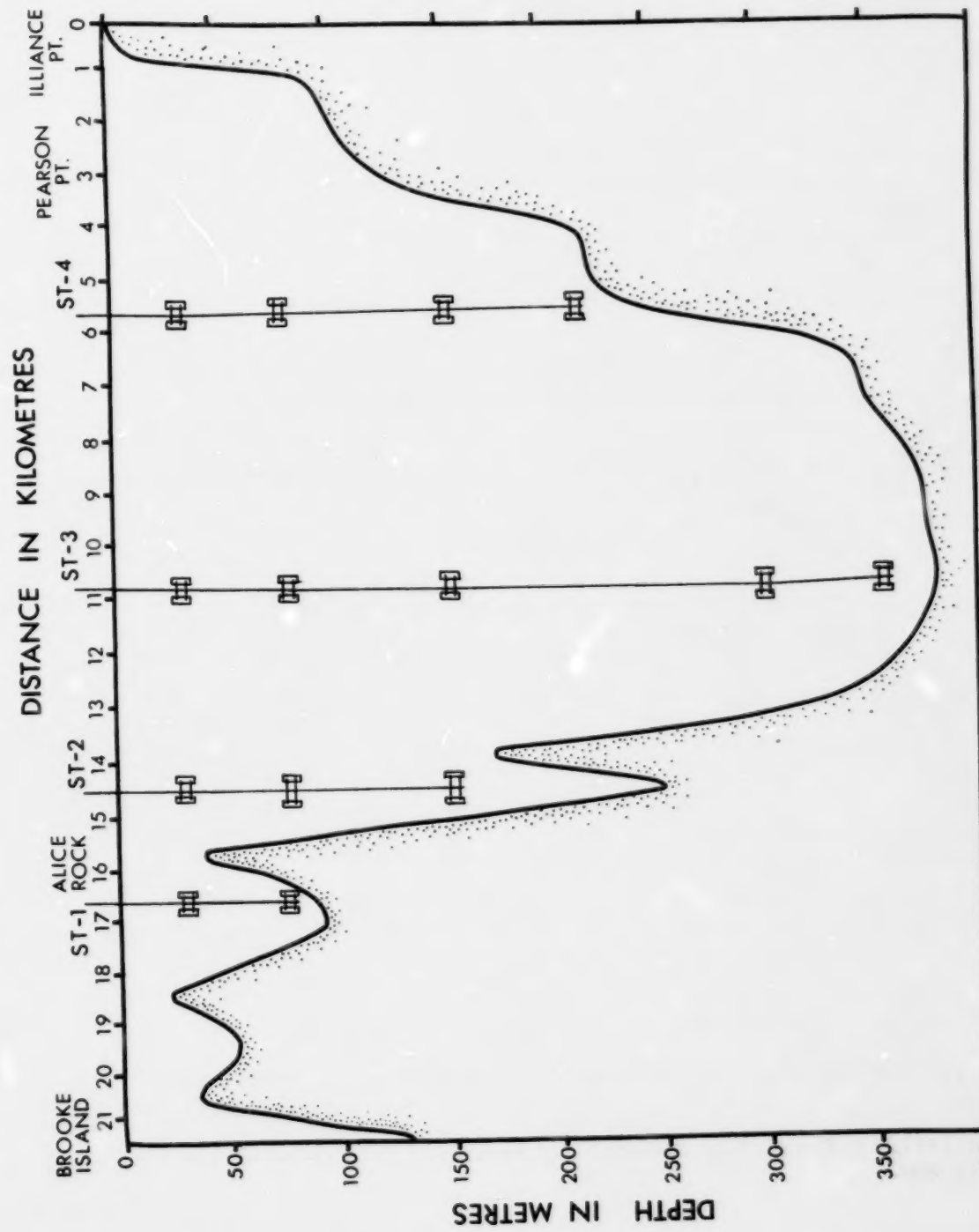
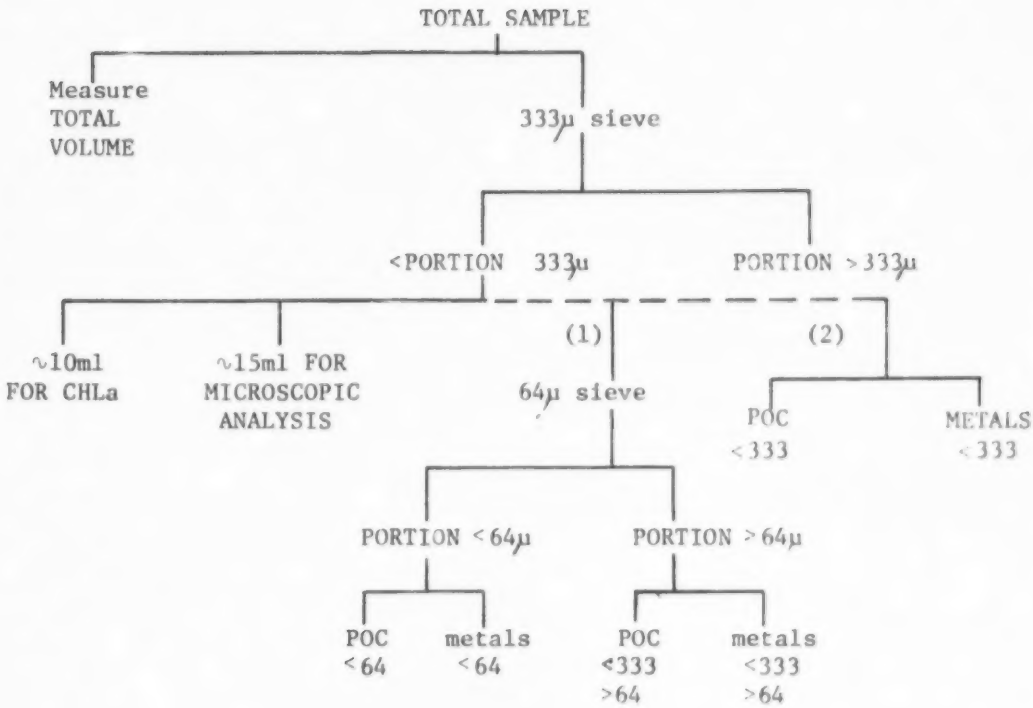


Fig. 2. Sediment trap deployment locations



(1)	ST-1	ST-2	ST-3	ST-4
	4a, 5a	6a, 7a, 8a, 9a	ALL TRAPS - a and b	15a, 17a, 18a
(2)	ST-1	ST-2	ST-3	ST-4
	4b, 5b	6b, 7b, 8b, 9b	NONE	15b, 17b, 18b

Fig. 3(a). Sediment Trap Material : Subsampling (all traps except 16a, 16b), Alice Arm.

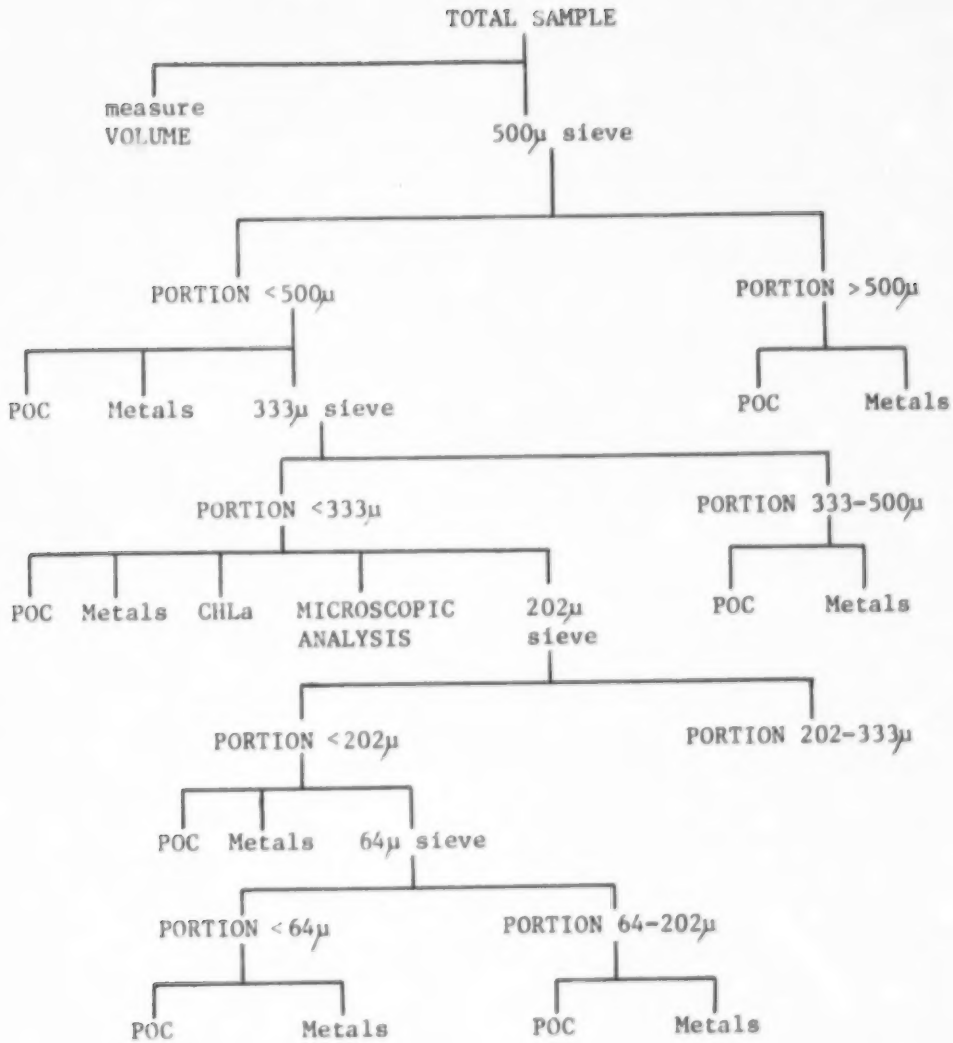


Fig. 3(b). Sediment Trap Material : Subsampling for traps 16a and 16b, Station 4 (150m), Alice Arm

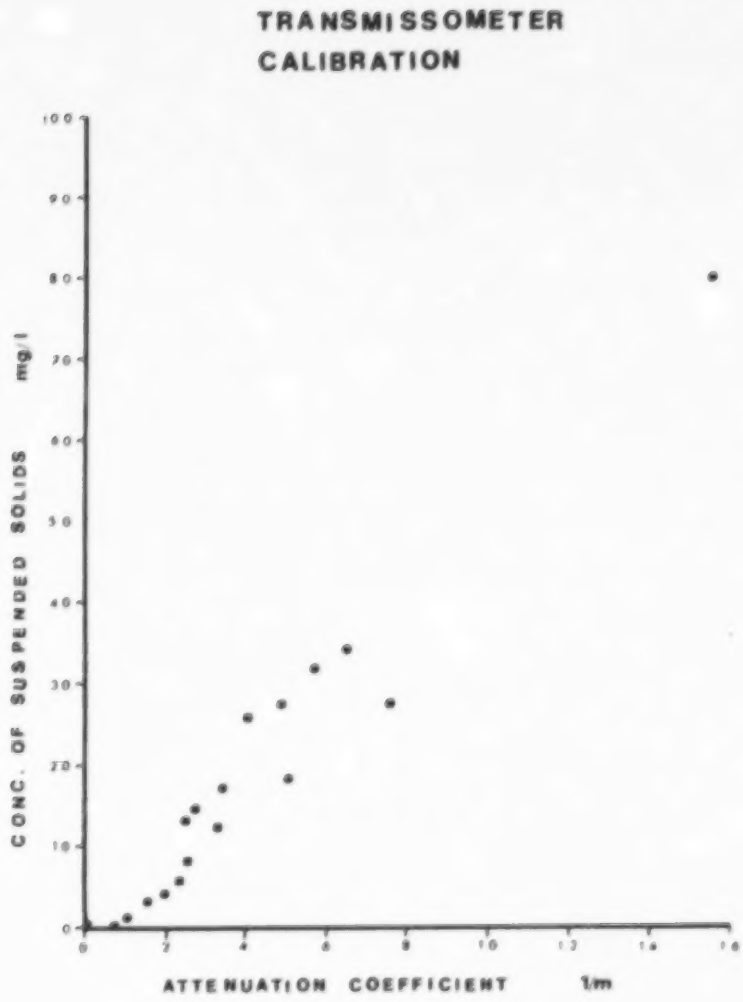


Fig. 4. Calibration data for the transmissometer

Appendix I.

Data Tables.

TABLE 1. ESTIMATES OF PRECISION, ACCURACY AND DETECTION LIMIT

Measurement	Precision (1s)	Accuracy (1s)	Detection limit
Salinity (CTD)	$<\pm 0.03$ (25)	$+0.055^{o}$/oo bias (see text)	
Temperature (CTD)	$<\pm 0.03C^{o}$	$-0.05C^{o}$ bias (see text)	
Pressure (CTD)	±0.05% FSP	±0.25 FSP	(FSP = 500db)
Turbidity (CTD)	Slope 4.6%	Relative to particulates	$\sim 0.10 mgL^{-1}$
Salinity (Guildline) Autosal	$\pm 0.0003^{o}$/oo[1] Instrumental ≤ 0.01[2]	±0.01	
Temperature (Thermometer)	$\pm 0.01C^{o}$	$\pm 0.02C^{o}$	
Oxygen	±0.2 mmol m^{-3}	±0.4 mmol m^{-3}	0.16 mmol m^{-3}
Chlorophyll a	<8% (depends on concentration)[3]	Not established[3]	0.07 μgL^{-1}
Coulter Counter ppmV	≤10% (n=31)	0.4% (coincidence)[4]	10^{3} total count[4]
Particulates (mgL^{-1})	$\pm 0.02 mgL^{-1}$ C.V. 6%	See text	$\leq 0.04 mgL^{-1}$ (2L volume)
Silicate	±4% (n=15)	±4%	~ 0.1 mmol m^{-3}
Nitrate	±1.4% (n=15)	±1.4%	~ 0.05 mmol m^{-3}
Phosphate	±2% (n=15)	±2%	~ 0.03 mmol m^{-3}
Sediment trap dry weight			
Within traps	±16%	<±3%	≤0.2mg
Between traps	±5%	Not established	

1. Based on replicate conductivity measurements (n=120)
2. Based on duplicate water samples (n=17)
3. Strickland and Parsons (1972)
4. Sheldon and Parsons (1967)

TABLE 2. STATION LOCATIONS FOR WATER SAMPLING

STATION	DATE	TIME (Z+8)	LOCATION LATITUDE N	LONGITUDE W	SAMPLES TAKEN
AA-1	27/09/82	1030	55° 24.75'	129° 40.75'	O,S,T, Nut, Chla, Part, C.C., Micro, CTDXT
AA-2	27/09/82	0812	55° 26.00'	129° 40.05'	O,S,T, Nut, Chla, Part, C.C., Micro, CTDXT
AA-3	26/09/82	1633	55° 27.15'	129° 37.05'	O,S,T, Nut, Chla, Part, C.C., Micro, CTDXT
AA-4	26/09/82	1028	55° 26.69'	129° 32.00'	O,S,T, Nut, Chla, Part, C.C., Micro.
AA-5	26/09/82	0818	55° 27.90'	129° 29.25'	O,S,T, Nut, Chla, Part, C.C., Micro, CTDXT
HA-3	27/09/82	1610	55° 32.50'	129° 47.10'	O,S,T, Nut, Part, C.C., Micro, CTDXT
GB-1	28/09/82	0807	55° 25.40'	129° 29.25'	O,S,T, Nut, Chla, Part, C.C., Micro, CTDXT
OB-6	28/09/82	1027	55° 21.30'	129° 45.70'	O,S,T, Nut, Chla, CTDXT
OB-4	28/09/82	1403	55° 13.90'	129° 51.10'	O,S,T, Nut, Part, C.C., Micro, CTDXT
OB-2	28/09/82	1808	55° 6.70'	129° 57.30'	O,S,T, Nut.
PI-2	28/09/82	2125	54° 43.80'	130° 24.30'	O,S,T, Nut.

TABLE 3. ALICE ARM CHEMICAL DATA (SEPTEMBER, 1982, OC-82-IS-003)

STATION AA-1 27/09/82 1030 (Z+8) Particulates DEPTH 86m
1045 CTD %T
1103 Bottlecast

DEPTH m	TEMP. ^{o}C	SALINITY X10^{3}	SIGMA T *	OXYGEN mmol m^{-3}	CHLa mg m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}	SUSP. mgL^{-1}	PART. mLL^{-1}
5	10.45	23.79	18.20	317	4.79	0.59	13.6	3.4	1.27	1.73
25	7.54	29.41	22.98	203	0.39	1.98	40.1	22.6	0.52	0.47
50	7.33	30.24	23.66	178	0.40	2.19	46.1	25.2	0.70	0.43
75	7.26	30.46	23.84	186	0.30	2.24(2.27)	44.7(37.3)	24.1(24.4)	0.66	0.43

STATION AA-2 27/09/82 0812 (Z+8) Particulates DEPTH 258m
0820 CTD %T
0907 Bottlecast

DEPTH m	TEMP. ^{o}C	SALINITY X10^{3}	SIGMA T	OXYGEN mmol m^{-3}	CHLa mg m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}	SUSP. mgL^{-1}	PART. mLL^{-1}
5	10.41	23.65	18.10	305	3.81	0.70	17.1	5.4	1.02	1.35
25	7.80	28.75	22.43	207	0.52	1.87	37.0	26.7	0.48	0.38
50	7.20	29.92	23.43	193	0.34	2.07	35.8	26.4	0.58	0.37
75	6.92	30.27	23.74	194	0.24	2.09	40.7	23.7	0.69	0.42
100	6.23	30.65	24.12	216	0.08	1.95	38.6	24.1	0.77	0.34
150	5.66	31.04	24.50	230		1.93(1.90)	40.4(41.4)	24.3(24.6)	0.66	0.40

* Sigma t has been calculated according to Knudsen's formula (see Fofonoff, N.P., 1962, in The Sea V.1, M.N. Hill ed., eqn 24, p 9) and is unitless.

$$\sigma_{t_{Knudsen}} = \left(\rho \frac{(s,t,o)}{\rho_{max}} - 1 \right) \times 1000 \text{ where } \rho_{max} = 0.999975 \text{ g cm}^{-3}$$

TABLE 3 (CONTINUED)

STATION AA-3 26/09/82 1633 (Z+8) Particulates DEPTH 386m
1800 CTD %T
1849 Bottlecast

DEPTH m	TEMP. ^{o}C	SALINITY $X10^{3}$	SIGMA T	OXYGEN mmol m^{-3}	CHLa mg m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}	SUSP. mgL^{-1}	PART. mLL^{-1}
5	9.77	24.33	18.72	262	0.94	1.14(1.10)	25.5(26.5)	12.2(12.3)	0.77	1.00
25	7.52	29.16	22.79	203	0.24	1.95	37.2	21.9	0.63	0.44
50	7.06	29.90	23.43	200	0.12	2.06	36.5	21.7	0.58	0.30
75	6.82	30.18	23.68	202	0.08	2.04	39.4	23.3	0.53	0.34
100	6.50	30.51	23.98	209	0.08	2.03	35.9	22.4	0.66	0.33
150	5.67	31.04	24.49	231		1.95(1.92)	40.8(36.9)	24.7(25.0)	0.63	0.37
200	5.51	31.15	24.60	229		2.05	44.4	25.8	0.69	0.40
250	5.48	31.17	24.62	230		1.93	43.7	25.1	0.62	0.45
300	5.50	31.19	24.63	223		1.73(1.72)	43.4(45.5)	25.5(25.6)	1.66	0.44

TABLE 3 (CONTINUED)

STATION AA-4 26/09/82 1000 (Z+8) CTD %T DEPTH 278m
1028 Particulates
1307 Bottlecast

DEPTH m	TEMP. °C	SALINITY X10^3	SIGMA T	OXYGEN mmol m^{-3}	CHLa mg m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}	SUSP. mgL^{-1}	PART. mLL^{-1}
5	10.10	23.66	18.15	266	1.22	1.07	24.6	10.4	1.29	1.29
25	7.53	29.06	22.71	203	0.12	1.87	37.8	22.0	0.71	0.31
50	7.05	29.90	23.43	202	0.10	1.99(2.02)	39.3(41.0)	23.5(23.4)	0.61	0.26
75	6.80	30.20	23.70	204	0.06	2.03	41.5	23.7	0.67	0.33
100	6.33	30.53	24.01	213	0.06	1.99	37.8	22.7	2.12	0.39
150	5.65	31.04	24.50	231		1.95	40.7	24.4	1.59	0.31
200	5.51	31.15	24.60	231		1.93	43.1	25.0	3.03	0.97
250	5.49	31.17	24.62	226		1.93	43.9	25.3	15.23	2.90

STATION AA-5 26/09/82 0818 (Z+8) Particulates DEPTH 104m
0840 Bottlecast
0930 CTD %T

DEPTH m	TEMP. °C	SALINITY X10^3	SIGMA T	OXYGEN mmol m^{-3}	CHLa mg m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}	SUSP. mgL^{-1}	PART. mLL^{-1}
5	8.88	26.06	20.19	224	0.52	1.50	30.0	17.0	>0.80*	0.48
25	7.25	29.38	23.00	204	0.10	1.98	35.7	22.0	0.72	0.32
50	6.92	29.91	23.46	208	0.05	1.98	36.7	22.6	1.09	0.46
75	6.73	30.16	23.68	209	0.07	2.00(2.02)	37.9(37.3)	22.6(22.8)	1.08	0.38

* Leak during filtration

TABLE 3 (CONTINUED)

STATION HA-3 27/09/82 1610 (Z+8) Particulates DEPTH 282m
1620 CTD %T
1713 Bottlecast

DEPTH m	TEMP. ^{o}C	SALINITY $X10^{3}$	SIGMA T	OXYGEN mmol m^{-3}	CHLa mg m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}	SUSP. mgL^{-1}	PART. mLL^{-1}
5	10.71	22.39	17.08	334		0.55	13.8	2.7	1.13	2.86
25	6.86	30.44	23.88	227		1.81	28.5	19.9	0.51	0.16
50	6.35	31.61	24.86	179		2.49	46.7	27.7	0.43	0.21
75	6.59	31.98	25.12	157		2.54	53.4	28.1	0.44	-
100	6.63	32.03	25.16	155		2.58	53.6	28.2	0.50	0.21
150	6.64	32.08	25.19	151		2.69	53.3	28.1	0.54	0.28
200	6.61	32.11	25.22	152		2.63	54.8	28.1	0.55	0.42
250	6.61	32.12	25.23	150		2.60(2.66)	51.3(42.8)	27.4(26.5)	0.45	0.35

STATION GB-1 28/09/82 0807 (Z+8) Particulates DEPTH 115m
0813 CTD %T
0854 Bottlecast

DEPTH m	TEMP. ^{o}C	SALINITY $X10^{3}$	SIGMA T	OXYGEN mmol m^{-3}	CHLa mg m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}	SUSP. mgL^{-1}	PART. mLL^{-1}
5	10.55	24.08	18.41	312	5.00	0.55	12.4	3.2	1.12	1.77
25	7.39	30.44	23.81	168	0.30	2.27(2.25)	43.8(45.0)	24.9(25.1)	0.42	0.23
50	6.79	31.78	24.94	148	0.27	2.55	52.2	27.7	1.01	0.28
75	6.54	32.36	25.43	140	0.17	2.73	57.6	29.7	0.59	0.24
100	6.51	32.53	25.56	126	0.20	3.00	60.3	29.7	1.07	0.55(0.57)

TABLE 3 (CONTINUED)

STATION OB-6 28/09/82 0956 CTD ZT DEPTH 242m
1027 (Z+8) Bottlecast

DEPTH m	TEMP. ^{o}C	SALINITY $X10^{3}$	SIGMA T	OXYGEN mmol m^{-3}	CHLa mg m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}	SUSP. mgL^{-1}	PART. mLL^{-1}
5	9.85	24.06	18.50	302	6.75	0.85	20.8	7.3		
25	7.25	30.97	24.24	161	0.94	2.36(2.33)	46.9(46.9)	26.2(26.1)		
50	6.75	31.87	25.01	149	0.36	2.57	52.5	27.6		
75	6.49	32.52	25.56	143	0.17	2.64	59.9	31.0		
100	6.46	32.64	25.66	140	0.15	2.66	56.7	29.8		
150	6.43	32.77	25.76	136		2.76(2.64)	56.7(56.2)	30.8(29.4)		
200	6.41	32.78	25.77	136		2.66	60.8	32.2		

TABLE 3 (CONTINUED)

STATION OB-4 28/09/82 1303 (Z+8) Bottlecast DEPTH 503m
1320 CTD %T
1403 Particulates

DEPTH m	TEMP. ^{o}C	SALINITY $X10^{3}$	SIGMA T	OXYGEN mmol m^{-3}	CHLa mg m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}	SUSP. mgL^{-1}	PART. mLL^{-1}
5	9.75	24.46	18.82	304		0.89	20.3	7.5	0.86	1.17
25	7.59	30.63	23.93	168		2.29	44.2	24.8	0.78	0.51
50	7.03	31.69	24.84	155		2.44	50.1	27.4	0.61	0.29
75	6.63	32.19	25.28	148		2.58	52.8	28.5	0.39	0.17
100	6.49	32.58	25.61	146		2.62	55.2	28.9	0.40	0.26
150	6.40	32.74	25.74	139		2.64(2.55)	55.7(55.9)	29.7(29.9)	0.35	0.52(0.54)
200	6.39	32.78	25.78	137		2.70	54.7	29.6	0.38	0.19
250	6.42	32.79	25.78	136		2.63	38.4	21.5	0.52	0.23
300	6.42	32.80	25.79	136		2.62	55.8	30.3	0.50	0.23
400	6.42	32.83	25.81	132		2.68(2.84)	57.0(57.1)	30.6(29.5)	0.64	0.25
500	6.42	32.83	25.81	132		2.72	53.6	28.1	1.21	0.28

TABLE 3 (CONTINUED)

STATION OB-2 28/09/82 1718 CTD ZT DEPTH 430m
1808 Bottlecast

DEPTH m	TEMP. ^{o}C	SALINITY $X10^{3}$	SIGMA T	OXYGEN mmol m^{-3}	CHLa mg m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}	SUSP. mgL^{-1}	PART. mLL^{-1}
5	9.58	24.96	19.24	296		1.00	28.7	9.1		
25	7.87	31.38	24.48	162		2.24	43.2	24.8		
50	6.98	32.15	25.53	145		2.60	53.5	28.5		
75	6.56	32.59	25.60	146		2.58	54.3	29.1		
100	6.44	32.69	25.70	140		2.61	55.0	29.8		
150	6.45	32.76	25.74	132		2.68(2.62)	56.2(56.2)	30.3(30.2)		
200	6.41	32.78	25.77	133		2.67	56.5	30.5		
250	6.41	32.80	25.79	134		2.74	52.1	28.6		
300	6.44	32.81	25.79	131		2.75	49.9	27.1		
400	6.44	32.83	25.81	128		2.78	56.0	30.4		

TABLE 3 (CONTINUED)

STATION PI-2 28/09/82 2055 CTD ZT DEPTH 540m
2125 (Z+8) Bottlecast

DEPTH m	TEMP. ^{o}C	SALINITY $X10^{3}$	SIGMA T	OXYGEN mmol m^{-3}	CHLa mg m^{-3}	PHOSPHATE mmol m^{-3}	SILICATE mmol m^{-3}	NITRATE mmol m^{-3}	SUSP. mgL^{-1}	PART. mLL^{-1}
5	8.86	29.61	22.96	204		1.83	34.4	19.1		
25	8.98	31.63	24.51	182		2.00	37.1	20.9		
50	8.38	32.18	25.03	156		2.25	45.7	24.4		
75	6.65	32.49	25.51	139		2.54(2.55)	51.1(48.1)	29.1(29.4)		
100	6.28	33.09	26.03	122		2.78	56.5	32.2		
150	6.19	33.29	26.20	114		2.81	59.2	32.6		
200	6.16	33.33	26.24	112		2.83	57.5	32.7		
250	6.13	33.35	26.26	112		2.84	59.0	32.7		
300	6.15	33.37	26.27	111		2.84	60.2	32.7		
400	6.16	33.38	26.28	110		2.86	61.4	33.1		
500	6.14	33.40	26.30	110		2.89	58.7	32.0		

TABLE 4. SUMMARY OF COULTER COUNTER DATA

COUNTS PER CHANNEL

STN	DEP M	VOL ML	COULTER COUNTER CHANNEL # 3	4	5	6	7	8	9	10	11	12	13	14	15
AA1	5	15.75	25543	17739	11151	3199	1516	1402	1195	430	243	115	22	25	12
AA1	25	14.49	25220	10434	3479	1056	725	350	129	71	38	14	6	2	2
AA1	50	15.63	13881	6871	3965	2063	996	569	234	80	18	20	2	0	1
AA1	75	15.63	13506	6879	4077	2145	884	527	218	94	19	22	3	1	1
AA2	5	16.00	51699	19827	9083	5498	2619	1216	582	279	169	58	14	9	6
AA2	25	15.63	12316	6131	3578	1663	780	593	173	80	31	22	1	0	0
AA2	50	15.75	12798	6260	3538	1788	755	327	137	64	20	25	3	4	0
AA2	75	15.87	21920	11194	4386	2058	801	366	156	39	18	28	3	0	0
AA2	100	15.87	21166	9297	3295	1431	598	242	108	35	21	22	2	1	0
AA2	150	15.87	11718	5943	3249	1693	966	435	195	63	24	19	13	3	0
AA3	5	15.87	48495	26562	9767	4942	2512	796	277	136	64	39	6	2	2
AA3	25	15.75	14327	7155	4143	2210	1070	488	195	105	36	21	2	1	0
AA3	50	16.00	10294	4860	2643	1334	535	202	96	33	6	6	21	4	0
AA3	75	16.00	12089	5649	2956	1534	763	406	160	58	17	9	10	2	0
AA3	100	16.00	12488	6019	3160	1506	741	394	180	60	26	15	5	0	0
AA3	150	15.87	9685	5087	2824	1548	801	451	189	62	23	23	7	2	1
AA3	200	15.87	11320	5966	3222	1705	892	467	163	73	42	24	6	1	1
AA3	250	15.87	12788	6517	3472	1833	971	477	215	109	44	25	12	1	0
AA3	300	16.00	30992	13263	5605	2158	898	329	108	41	14	12	3	1	0
AA4	5	15.75	24300	13925	6739	2507	1324	907	423	221	159	64	10	35	17
AA4	25	15.75	12045	5890	3047	1394	657	332	130	51	17	18	1	0	1
AA4	50	15.87	11016	5289	2574	1287	568	295	118	48	16	9	2	1	0
AA4	75	15.75	11064	5374	2836	1401	675	389	139	59	32	16	4	1	1
AA4	100	15.75	29969	11491	4470	1579	602	253	91	31	21	13	4	2	0
AA4	150	15.75	17115	7731	3471	1482	724	302	114	45	11	5	2	2	0
AA4	200	15.75	38518	18331	9154	4448	2291	1133	554	200	70	22	7	3	0
AA4	250	15.75	129862	65197	34056	16504	7827	3307	1280	435	134	33	10	0	1
AA5	5	15.87	15456	8265	3898	1828	890	477	198	107	53	20	2	6	1
AA5	25	15.75	13154	6344	3217	1509	575	281	96	43	21	27	3	1	1
AA5	50	15.63	14929	7555	3698	1737	834	462	202	50	30	15	16	6	0
AA5	75	15.75	17201	7844	3567	1618	766	389	154	59	22	29	2	0	0

TABLE 4. SUMMARY OF COULTER COUNTER DATA

COUNTS PER CHANNEL

	DEP	VOL	COULTER COUNTER CHANNEL #												
STN	M	ML	3	4	5	6	7	8	9	10	11	12	13	14	15
HA3	5	15.63	9169	24703	98954	41343	5389	529	179	66	21	9	3	5	3
HA3	25	15.63	8381	3446	1557	740	458	211	77	29	9	1	1	0	0
HA3	50	15.63	8476	3711	1825	874	435	219	106	58	12	5	1	2	0
HA3	100	15.75	10890	5118	2379	982	396	162	47	38	11	5	3	1	0
HA3	150	15.75	9910	5193	2450	1200	538	224	110	42	21	11	5	3	1
HA3	200	15.75	15199	8667	3821	2014	850	445	208	75	28	17	6	2	0
HA3	250	15.63	19408	9179	3323	1673	717	302	105	56	22	13	2	1	0
GR1	5	15.75	41062	21174	7480	2768	1381	1072	836	303	219	83	35	39	22
GR1	25	15.75	6704	3326	2023	1038	564	309	102	34	12	16	1	1	1
GR1	50	15.75	8674	3866	2229	1188	549	280	115	49	14	11	12	1	1
GR1	75	15.75	15478	6375	2994	1152	429	162	76	39	9	11	1	0	0
GR1	100	15.75	41147	21429	6933	2560	767	246	78	34	10	35	0	0	0
GR1	100	15.75	37378	20818	7257	3203	963	234	80	33	9	34	0	2	0
OB4	5	15.63	32041	15294	9131	4946	2792	1455	503	108	83	54	13	11	6
OB4	25	15.87	19709	10181	4454	2391	1129	499	217	94	39	19	1	5	1
OB4	50	15.63	11327	5303	2902	1335	675	356	153	40	17	10	2	1	0
OB4	75	15.63	7530	3209	1682	805	373	150	104	29	11	6	1	1	0
OB4	75	15.63	7530	3209	1682	805	373	150	104	29	11	6	1	1	0
OB4	100	15.87	11852	4863	1945	920	373	158	89	27	12	24	2	1	3
OB4	150	15.87	22351	14457	3517	2382	2333	1190	95	18	7	9	0	0	0
OB4	150	15.75	21244	13787	3266	2184	1996	1153	275	25	7	13	1	2	0
OB4	200	15.75	6550	4002	2005	1067	498	254	95	23	15	3	0	0	0
OB4	250	15.75	6993	3634	2077	1105	536	243	85	31	18	6	9	1	0
OB4	300	15.75	6081	4217	2373	1176	612	256	91	48	17	5	0	0	1
OB4	400	15.75	11735	6158	3189	1493	648	224	83	44	11	4	2	0	0
OB4	500	15.75	19074	8843	3766	1519	503	187	64	29	13	4	2	0	0
L9	0	15.50	142135	84533	51010	27145	13756	6139	2635	867	318	81	12	1	0
M11	0	15.63	98934	56076	33618	18826	9676	4108	1456	487	150	62	10	0	0
N10	0	15.63	696731	633001	23850	75083	42071	21547	10961	4958	2244	945	222	20	1
O13	0	15.63	160759	97298	57869	32065	17924	9141	4387	1763	529	135	21	6	0
N14	0	15.63	98643	49872	25614	11894	5279	2045	772	268	66	30	7	0	0

TABLE 4. SUMMARY OF COULTER COUNTER DATA

COUNTS PER CHANNEL

STN	DEP M	VOL ML	S	COULTER COUNTER CHANNEL # 4	5	6	7	8	9	10	11	12	13	14	15
P12	0	15.63	121937	72540	45683	26552	14999	7308	3100	1003	269	70	27	4	5
P16	0	15.50	113715	61702	35155	18678	1926	4674	1946	653	164	35	6	2	0
P19	0	15.63	72217	36733	19830	10025	4639	1799	569	184	39	9	2	0	0
P16	0	15.63	75810	39696	22115	11626	6154	2849	1237	431	113	17	2	0	0
019	0	15.50	49661	21598	9693	4120	1735	580	170	52	10	4	2	0	0
R19	0	15.63	30492	13842	5632	2229	949	329	96	23	10	5	0	0	0
019	0	15.50	16283	8369	4021	2038	1030	467	181	53	26	13	4	1	0

TABLE 5. SEDIMENT TRAP STATIONS

STATION	LAT. °N	LONG. °W	TRAP DEPTH (METERS)	DEPLOYED 24/09/82 TIME	RECOVERED 01/10/82	DEPLOYMENT INTERVAL (DAYS)
ST-1	55°24.54'	129°41.12'	30	1527	0809	6.70
(109m)			67	1522	0812	6.70
ST-2	55°26.00'	129°40.10'	30	1613	0835	6.68
(259m)			70	1610	0837	6.69
			150	1608	0839	6.69
			226	1605	0841	6.69
ST-3	55°27.16'	129°36.75'	30	1700	0911	6.68
(378m)			70	1655	0908	6.68
			150	1652	0905	6.68
			300	1648	0903	6.67
			353	1645	0901	6.67
ST-4	55°26.72'	129°31.62	30	1735	0948	6.68
(234m)			70	1740	0946	6.67
			150	1743	0944	6.67
			208	1746	0942	6.66

TABLE 6(a). SEDIMENT TRAP SUBSAMPLING DATA SEPTEMBER/OCTOBER 1982

SIDE a - CONTAINED SODIUM AZIDE
SIDE b - NO SODIUM AZIDE

STN.	DEPTH (m)	TIME (DAYS)	SIDE OF TRAP	TOTAL VOLUME (mL)	SIZE FRACTION (μm)	VOLUME FOR MICRO-SCOPE ANALY. (mL)	VOLUME FOR CHLa ANALY. (mL)	VOLUME FOR POC,N ANALYSIS (mL)	SUBSAMPLES FOR METAL ANALYSIS AND DRY WEIGHT DETERMINATION		
									VOL. (mL)	WEIGHT OF SEDIMENT (mg)	CONC. (gL^{-1})
ST-1	30	6.70	a	550	<333	15	10	22	86	0.1576	0.36
					64-333			22	238	0.1021	0.43
					<64				224	0.0941	0.42
			b	660	<333	15	10	18.5	256	0.1780	0.70
									256	0.1884	0.74
	67	6.70	a	720	<333	15	9.3	19	65	0.1855	0.33
					64-333			38	282	0.1883	0.67
					<64				286	0.1787	0.63
			b	640	<333	15	9.3	25	197	0.2406	1.22
									190	0.2342	1.23
									185	0.2330	1.26

TABLE 6(a). SEDIMENT TRAP SUBSAMPLING DATA (CONTINUED) SEPTEMBER/OCTOBER 1982

SIDE a - CONTAINED SODIUM AZIDE
SIDE b - NO SODIUM AZIDE

STN.	DEPTH (m)	TIME (DAYS)	SIDE OF TRAP	TOTAL VOLUME (mL)	SIZE FRACTION (μm)	VOLUME FOR MICRO-SCOPE ANAL. (mL)	VOLUME FOR CHLa ANALY. (mL)	VOLUME FOR POC,N ANALYSIS (mL)	SUBSAMPLES FOR METAL ANALYSIS AND DRY WEIGHT DETERMINATION		
									VOL. (mL)	WEIGHT OF SEDIMENT (mg)	CONC. (gL^{-1})
ST-2	30	6.68	a	670	<333	15	10.2				
					64-333			14	58	0.1784	0.33
					<64			16	307	1.2416	4.04
									272	1.1508	4.23
			b	590	<333	15	9.2	26	271	1.4172	5.23
									264	1.3660	5.17
	70	6.69	a	560	<333	15	8.4				
					64-333			16	80	0.3049	0.73
					<64			25	237	1.1764	4.96
									244	1.2116	4.97
			b	620	<333	15	-	24	280	1.6682	5.96
									278	1.6376	5.89
	150	6.69	a	720	<333	15	9.6				
					64-333			15	59	0.4238	0.77
					<64			21	278	1.0371	3.73
									278	0.9437	3.39
			b	615	<333	15	7.9	17	260	1.4649	5.63
									260	1.4792	5.69

TABLE 6(a). SEDIMENT TRAP SUBSAMPLING DATA (CONTINUED) SEPTEMBER/OCTOBER 1982

SIDE a - CONTAINED SODIUM AZIDE
SIDE b - NO SODIUM AZIDE

STN.	DEPTH (m)	TIME (DAYS)	SIDE OF TRAP	TOTAL VOLUME (mL)	SIZE FRACTION (μm)	VOLUME FOR MICRO-SCOPE ANAL. (mL)	VOLUME FOR CHLa ANALY. (mL)	VOLUME FOR POC,N ANALYSIS (mL)	SUBSAMPLES FOR METAL ANALYSIS AND DRY WEIGHT DETERMINATION		
									VOL. (mL)	WEIGHT OF SEDIMENT (mg)	CONC. (gL^{-1})
ST-2	226	6.69	a	622	<333	15	10.2				
					64-333			24	44	0.3088	0.77
					<64			18	260	1.4857	5.71
									262	1.4952	5.71
			b	640	<333	15	8.5	20	278	1.7971	6.46
									272	1.7699	6.51
ST-3	30	6.68	a	520	<333	15	7.4				
					64-333			19	56	0.0372	0.096
					<64			55	213	0.0569	0.267
									212	0.0535	0.252
			b	710	<333	15	9.6				
					64-333			14	61	0.0287	0.050
					<64			115	275	0.0551	0.200
									276	0.0381	0.138

TABLE 6(a). SEDIMENT TRAP SUBSAMPLING DATA (CONTINUED) SEPTEMBER/OCTOBER 1982

SIDE a - CONTAINED SODIUM AZIDE
SIDE b - NO SODIUM AZIDE

STN.	DEPTH (m)	TIME (DAYS)	SIDE OF TRAP	TOTAL VOLUME (mL)	SIZE FRACTION (μm)	VOLUME FOR MICRO-SCOPE ANAL. (mL)	VOLUME FOR CHLa ANALY. (mL)	VOLUME FOR POC,N ANALYSIS (mL)	SUBSAMPLES FOR METAL ANALYSIS AND DRY WEIGHT DETERMINATION		
									VOL. (mL)	WEIGHT OF SEDIMENT (mg)	CONC. (gL^{-1})
ST-3	70	6.68	a	540	<333	15	9.2				
					64-333			18	70	0.0558	0.13
					<64			32	235	0.1007	0.429
									220	0.0942	0.428
			b	460	<333	15	10				
					64-333			14	63	0.0478	0.13
					<64			44	195	0.0899	0.461
									197	0.0920	0.467
	150	6.68	a	465	<333	15	9.0				
					64-333			15.5	57	0.0749	0.21
					<64			29	208	0.1671	0.803
									183	0.1415	0.773
			b	540	<333	15	8.8				
					64-333			14	67	0.0635	0.14
					<64			20	240	0.1858	0.774
									245	0.1913	0.781

TABLE 6(a). SEDIMENT TRAP SUBSAMPLING DATA (CONTINUED) SEPTEMBER/OCTOBER 1982

SIDE a - CONTAINED SODIUM AZIDE
SIDE b - NO SODIUM AZIDE

STN.	DEPTH (m)	TIME (DAYS)	SIDE OF TRAP	TOTAL VOLUME (mL)	SIZE FRACTION (μm)	VOLUME FOR MICRO-SCOPE ANAL. (mL)	VOLUME FOR CHLa ANALY. (mL)	VOLUME FOR POC,N ANALYSIS (mL)	SUBSAMPLES FOR METAL ANALYSIS AND DRY WEIGHT DETERMINATION		
									VOL. (mL)	WEIGHT OF SEDIMENT (mg)	CONC. (gL^{-1})
ST-3	300	6.67	a	545	<333	15	9.6				
					64-333			18	65	0.1117	0.26
					<64			25	254	0.466	1.83
									234	0.424	1.81
			b	560	<333	15	8.8				
					64-333			19	63	0.0979	0.23
					<64			21	244	0.4601	1.89
									240	0.4535	1.89
	353	6.67	a	530	<333	15	9.0				
					64-333			16	59	0.2220	0.53
					<64			26	236	1.5027	6.37
									235	1.5280	6.50
			b	560	<333	15	8.5				
					64-333			18	64	0.1933	0.44
					<64			24	244	1.5794	6.47
									242	1.5826	6.54

TABLE 6(a). SEDIMENT TRAP SUBSAMPLING DATA (CONTINUED) SEPTEMBER/OCTOBER 1982

SIDE a - CONTAINED SODIUM AZIDE
SIDE b - NO SODIUM AZIDE

STN.	DEPTH (m)	TIME (DAYS)	SIDE OF TRAP	TOTAL VOLUME (mL)	SIZE FRACTION (μm)	VOLUME FOR MICRO-SCOPE ANAL. (mL)	VOLUME FOR CHLa ANALY. (mL)	VOLUME FOR POC,N ANALYSIS (mL)	SUBSAMPLES FOR METAL ANALYSIS AND DRY WEIGHT DETERMINATION		
									VOL. (mL)	WEIGHT OF SEDIMENT (mg)	CONC. (gL^{-1})
ST-4	30	6.68	a	615	<333	15	9.5				
					64-333			13	57	0.0452	0.09
					<64			28	263	0.0952	0.362
									275	0.1002	0.364
			b	480	<333	15	8.2	34	208	0.1222	0.588
									201	0.1189	0.592
	70	6.67	a	455	<333	15	8.2				
					64-333			18	68	0.0310	0.086
					<64			34	181	0.1138	0.629
									195	0.1266	0.649
			b	430	<333	15	8.5	28	234	0.2222	0.950
									229	0.2189	0.956
	150	6.67	a	690	>500			21	30	0.0016	0.052
					333-500			27	44	0.0022	0.049
					<333	15	3.6				
					202-333			32	43	0.0065	0.15
					64-202			44	46	0.034	0.74
					<64			25	194	3.768	19.4
									197	3.928	19.9
									228	4.366	19.1

TABLE 6(a). SEDIMENT TRAP SUBSAMPLING DATA (CONTINUED) SEPTEMBER/OCTOBER 1982

SIDE a - CONTAINED SODIUM AZIDE
SIDE b - NO SODIUM AZIDE

STN.	DEPTH (m)	TIME (DAYS)	SIDE OF TRAP	TOTAL VOLUME (mL)	SIZE FRACTION (μm)	VOLUME FOR MICRO-SCOPE ANAL. (mL)	VOLUME FOR CHLa ANALY. (mL)	VOLUME FOR POC,N ANALYSIS (mL)	SUBSAMPLES FOR METAL ANALYSIS AND DRY WEIGHT DETERMINATION		
									VOL. (mL)	WEIGHT OF SEDIMENT (mg)	CONC. (gL^{-1})
ST-4			b	600	>500			35	56	0.0039	0.070
					333-500			38	44	0.0036	0.082
					<333	15	-				
					202-333			20	27	0.0017	0.062
					64-202			21	35	0.036	1.01
					<64			22	208	4.494	21.6
									166	3.562	21.4
									169	3.589	21.2
	208	6.66	a	790	<333	15	8.6				
					64-333			43	68	1.480	3.06
					<64			34	242	13.945	57.6
									240	13.999	58.3
									245	14.216	58.0
			b	605	<333	15	6.5	25	260	21.405	82.3
									270	22.134	81.9

TABLE 6(b). CORRECTIONS TO TOTAL TRAP WEIGHTS FROM RESIEVING >333 PORTION, SEPTEMBER/OCTOBER 1982

SIDE a - PRESERVATIVES
SIDE b - NO PRESERVATIVES

WEIGHT OF TOTAL UNCORRECTED SOLID IS AVERAGE VALUE CALCULATED FROM ALIQUOTS

STN.	DEPTH (m)	SIDE OF TRAP	WT. OF TOTAL SOLIDS UNCORR. >64 (g)	WT. OF CORR. FOR SOLIDS >64 (g)	WT. OF CORR. SOLIDS >64 (g)	WT. OF TOTAL SOLIDS UNCORR. <64 (g)	WT. OF CORR. FOR SOLIDS <64 (g)	WT. OF CORR. SOLIDS <64 (g)	WT. OF TOTAL SOLIDS UNCORR. <333 (g)	WT. OF CORR. FOR SOLIDS <333 (g)	WT. OF CORR. SOLIDS <333 (g)	SEDIMENT TRAPPING RATE USING CORR. VALUES $gm^{-2}day^{-1}$
ST-1	30	a	0.198	0.0489	0.247	0.234	0.0222	0.256	0.432	0.0711	0.503	5.82
		b	-	0.0368	-	-	0.0373	-	0.475	0.0741	0.549	6.35
	67	a	0.238	0.0436	0.282	0.468	0.0429	0.511	0.706	0.0865	0.793	9.18
		b	-	0.0357	-	-	0.0320	-	0.791	0.0677	0.859	9.94
ST-2	30	a	0.221	0.0891	0.310	2.771	0.1726	2.944	2.992	0.2617	3.254	37.7
		b	-	-	-	-	-	-	3.068	0.1584	3.226	37.4
	70	a	0.409	0.1498	0.559	2.781	0.2328	3.014	3.190	0.3826	3.573	41.4
		b	-	-	-	-	-	-	3.674	0.2046	3.674	42.5
	150	a	0.554	0.1032	0.657	2.563	0.1476	2.711	3.117	0.2508	3.368	39.0
		b	-	-	-	-	-	-	3.481	0.1489	3.630	42.0
	226	a	0.479	0.1156	0.595	3.552	0.2495	3.802	4.031	0.3651	4.396	50.9
		b	-	-	-	-	-	-	4.150	0.4691	4.619	53.5
ST-3	30	a	0.050	0.00565	0.056	0.135	0.01269	0.148	0.185	0.01834	0.203	2.36
		b	0.036	0.00556	0.042	0.121	0.00843	0.129	0.157	0.01399	0.171	1.98
	70	a	0.070	0.00575	0.076	0.232	0.01166	0.244	0.302	0.01741	0.319	3.70
		b	0.060	-	-	0.214	-	-	0.274	0.01475	0.289	3.35

TABLE 6(b). CORRECTIONS TO TOTAL TRAP WEIGHTS FROM RESIEVING >333 PORTION, SEPTEMBER/OCTOBER 1982 (CONTINUED)

SIDE a - PRESERVATIVES
SIDE b - NO PRESERVATIVES

WEIGHT OF TOTAL UNCORRECTED SOLID IS AVERAGE VALUE CALCULATED FROM ALIQUOTS

STN.	DEPTH (m)	SIDE OF TRAP	WT. OF TOTAL SOLIDS UNCORR. >64 (g)	WT. OF CORR. FOR SOLIDS >64 (g)	WT. OF CORR. SOLIDS >64 (g)	WT. OF TOTAL SOLIDS UNCORR. <64 (g)	WT. OF CORR. FOR SOLIDS <64 (g)	WT. OF CORR. SOLIDS <64 (g)	WT. OF TOTAL SOLIDS UNCORR. <333 (g)	WT. OF CORR. FOR SOLIDS <333 (g)	WT. OF CORR. SOLIDS <333 (g)	SEDIMENT TRAPPING RATE USING CORR. VALUES $gm^{-2}day^{-1}$
ST-3	150	a	0.098	0.01326	0.111	0.365	0.02033	0.385	0.463	0.03359	0.497	5.77
		b	0.076	-	-	0.418	-	-	0.494	0.02475	0.519	6.02
	300	a	0.142	0.0093	0.151	0.992	0.0210	1.013	1.134	0.0303	1.164	13.5
		b	0.129	-	-	1.058	-	-	1.187	0.01759	1.205	14.0
	353	a	0.281	0.0221	0.303	3.411	0.0592	3.470	3.692	0.0813	3.773	43.8
		b	0.246	-	-	3.642	-	-	3.888	0.0331	3.921	45.5
ST-4	30	a	0.055	-	-	0.221	-	-	0.276	-	-	3.20
		b	-	-	-	-	-	-	0.283	-	-	3.28
	70	a	0.039	-	-	0.292	-	-	0.331	-	-	3.85
		b	-	-	-	-	-	-	0.507	-	-	5.89
	150	a	13.46	-	-	-	-	-	-	-	-	156.4
		b	12.85	-	-	-	-	-	-	-	-	149.3
	208	a	2.417	0.05566	-	45.814	0.21599	-	48.231	0.26665	48.498	564.5
		b	-	-	-	-	-	-	49.704	0.02569	49.730	578.8

TABLE 6(c). AMOUNTS CAUGHT IN SEDIMENT TRAPS, SEPTEMBER/OCTOBER, 1982

STATION	DEPTH	TOTAL SEDIMENTATION $gm^{-2}day^{-1}$ DRY WEIGHT ($\bar{X} \pm s$ (n)) a) Sodium Azide	b) No Preservative	AVERAGE TOTAL SEDIMENTATION $gm^{-2}day^{-1}$ a and b Sides $\bar{X} \pm s$
ST-1	30	5.82 ± 0.04(2)[1]	6.35 ± 0.22(2)	6.09 ± 0.38
	67	9.18 ± 0.24(2)[1]	9.94 ± 0.16(2)	9.56 ± 0.17
ST-2	30	37.76 ± 1.04(2)[1]	37.44 ± 0.29(2)	37.60 ± 0.23
	70	41.40 ± 0.05(2)[1]	42.57 ± 0.36(2)	41.99 ± 0.83
	150	39.03 ± 2.01(2)[1]	42.06 ± 0.30(2)	40.55 ± 2.14
	226	50.94 ± 0.00(2)[1]	53.52 ± 0.26(2)	52.23 ± 1.82
ST-3	30	2.36 ± 0.09(2)[1]	1.98 ± 0.35(2)[1]	2.17 ± 0.27
	70	3.70 ± 0.00(2)[1]	3.35 ± 0.04(2)[1]	3.53 ± 0.25
	150	5.77 ± 0.11(2)[1]	6.02 ± 0.04(2)[1]	5.80 ± 0.32
	300	13.53 ± 0.09(2)[1]	14.00 ± 0.00(2)[1]	13.77 ± 0.33
	353	43.85 ± 0.57(2)[1]	45.57 ± 0.32(2)[1]	44.71
ST-4	30	3.20 ± 0.00(2)	3.28 ± 0.00(2)	3.24 ± 0.06
	70	3.85 ± 0.08(2)	5.89 ± 0.04(2)	4.87 ± 1.44
	150	156.4 ± 3.2 (3)[1,2]	149.3 ± 1.4 (3)[1,2]	152.9 ± 5.0 [2]
	208	569.6 ± 3.3 (3)[1]	578.8 ± 1.7 (2)	574.2 ± 6.5

1. s represents deviation for <64μm portion only. The other within trap standard deviations are calculated from the <333μm fractions.

2. Sedimentation rate represents <64μm portion only.

TABLE 7. SEDIMENT CORING LOCATIONS

DATE	LOCATION	DEPTH m	#	CORE LENGTH mm	COMMENTS
29/9/82	One cable E of ST-3	389	1	1300	Yellow near bottom
"	"	403	2	1230	
"	One cable S of ST-2	277	3	1230	
"	"	270	4	860	
"	HA-2	317	5	700	Lowered core twice
"	"	320	6	1030	Good surface
"	OB-5	556	7	1380	Grey mud
"	"	597	8	1910	
"	GB-1	119	9	600	
"	"	118	10	600	
30/9/82	One cable W of ST-4	271	11	1300	Top 630mm grey tailings shading to an intermediate color and dark at the bottom
"	"	271	12	960	0-260mm dark, 260-600mm greenish, 600-960mm grey tailings

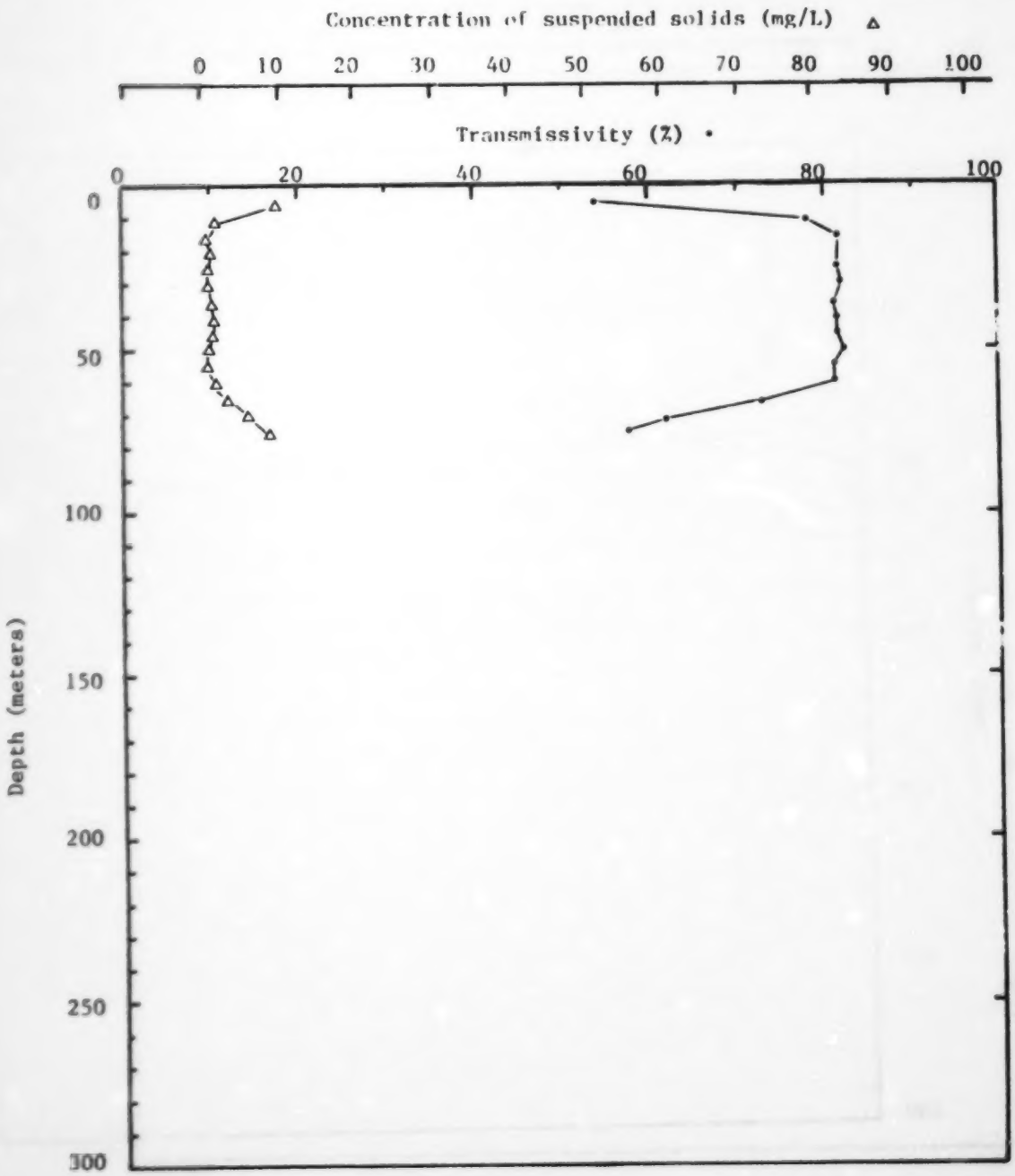
TABLE 8. STATIONS AT WHICH A TRANSMISSOMETER PROFILE WAS TAKEN (READINGS RECORDED BY HAND AT 5m INTERVALS)

STATION	DATE	TIME (Z+8)	DEPTH m	Calibration READING Hz	%T[1]	mgL^{-1} measured
N-7	25/9/82	1017	80			
M-8	"	1020	109			
L-9	"	1050	153			
N-10	"	1112	150			
M-11	"	1129	179			
P-12	"	1157	165			
O-13	"	1225	168			
N-14	"	1250	164			
R-16	"	1328	~256	1465	67.5	3.19
Q-16	"	1413	246			
P-16	"	1457	240	1561	19.5	34.01
O-16	"	1526	110	1478	61.00	4.41
1 Cable W of ST-4	"	1600	237			
M-11	"	~2000	168			

1 $\%T = \frac{1600 - Hz}{200} \times 100$

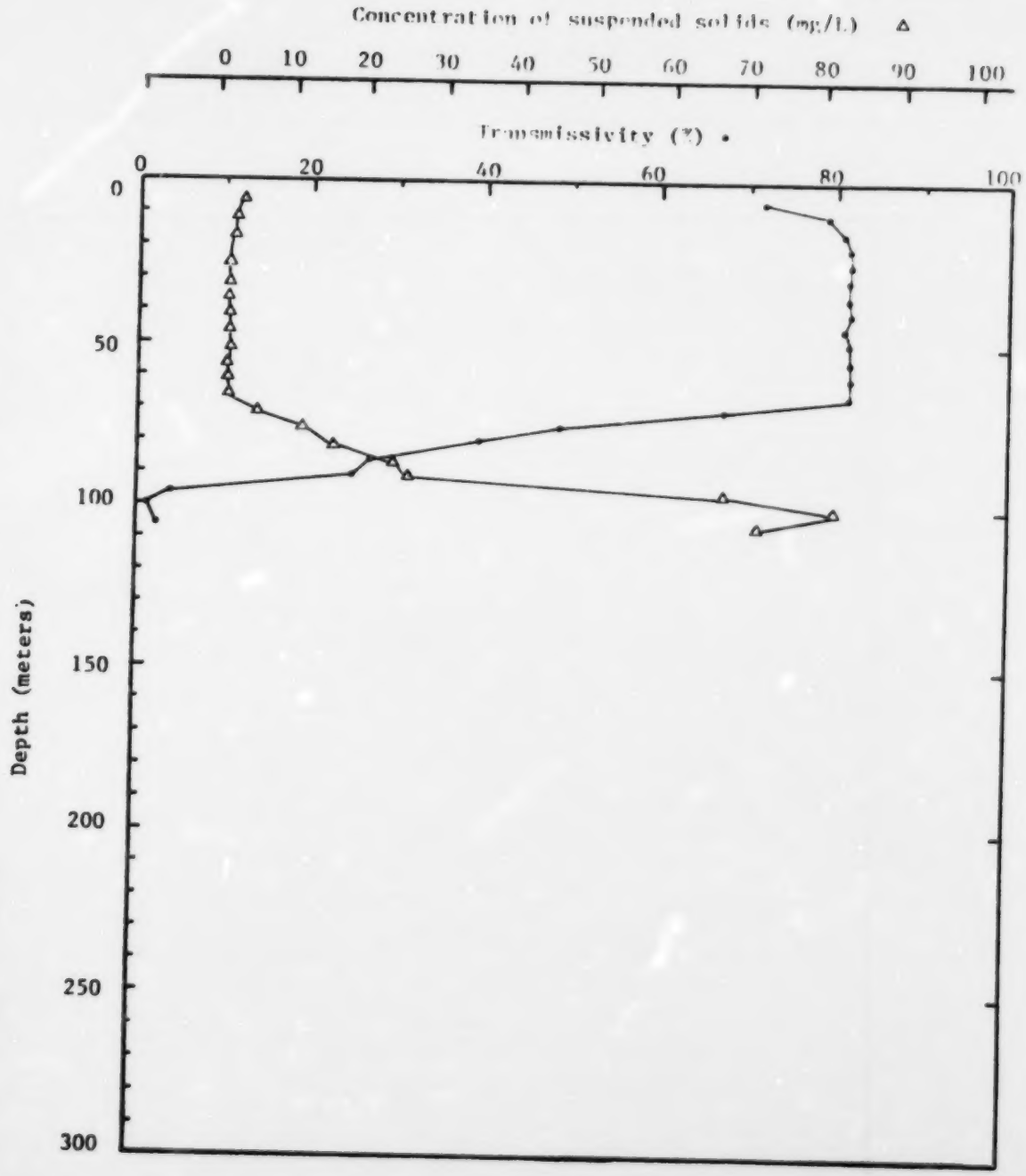
Survey Area : ALICE ARM
Station : N-7

Date : 25/09/82
Time : 1017-1025 PST



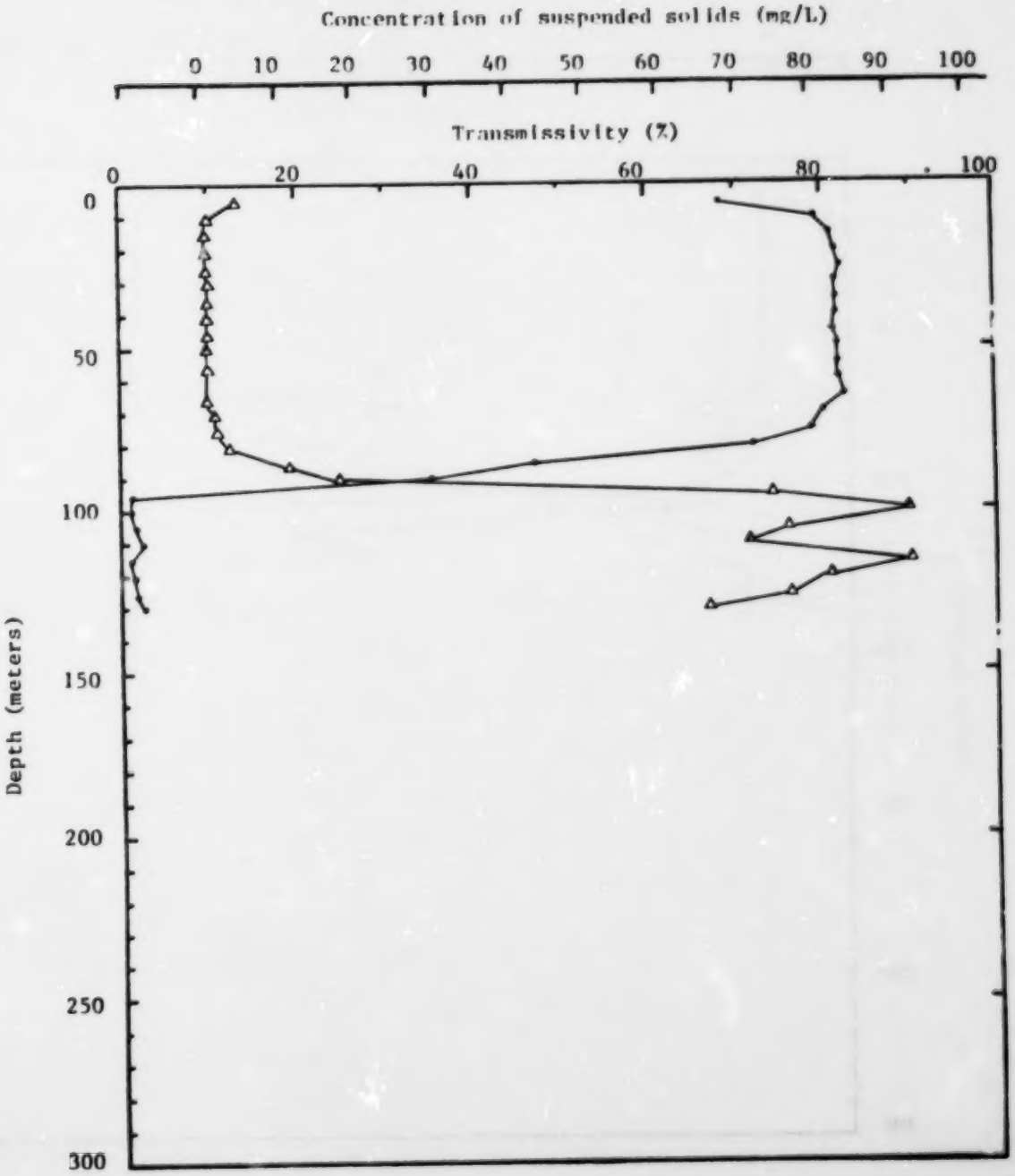
Survey Area : ALICE ARM
Station : M-8

Date : 25/09/82
Time : 1037 PST



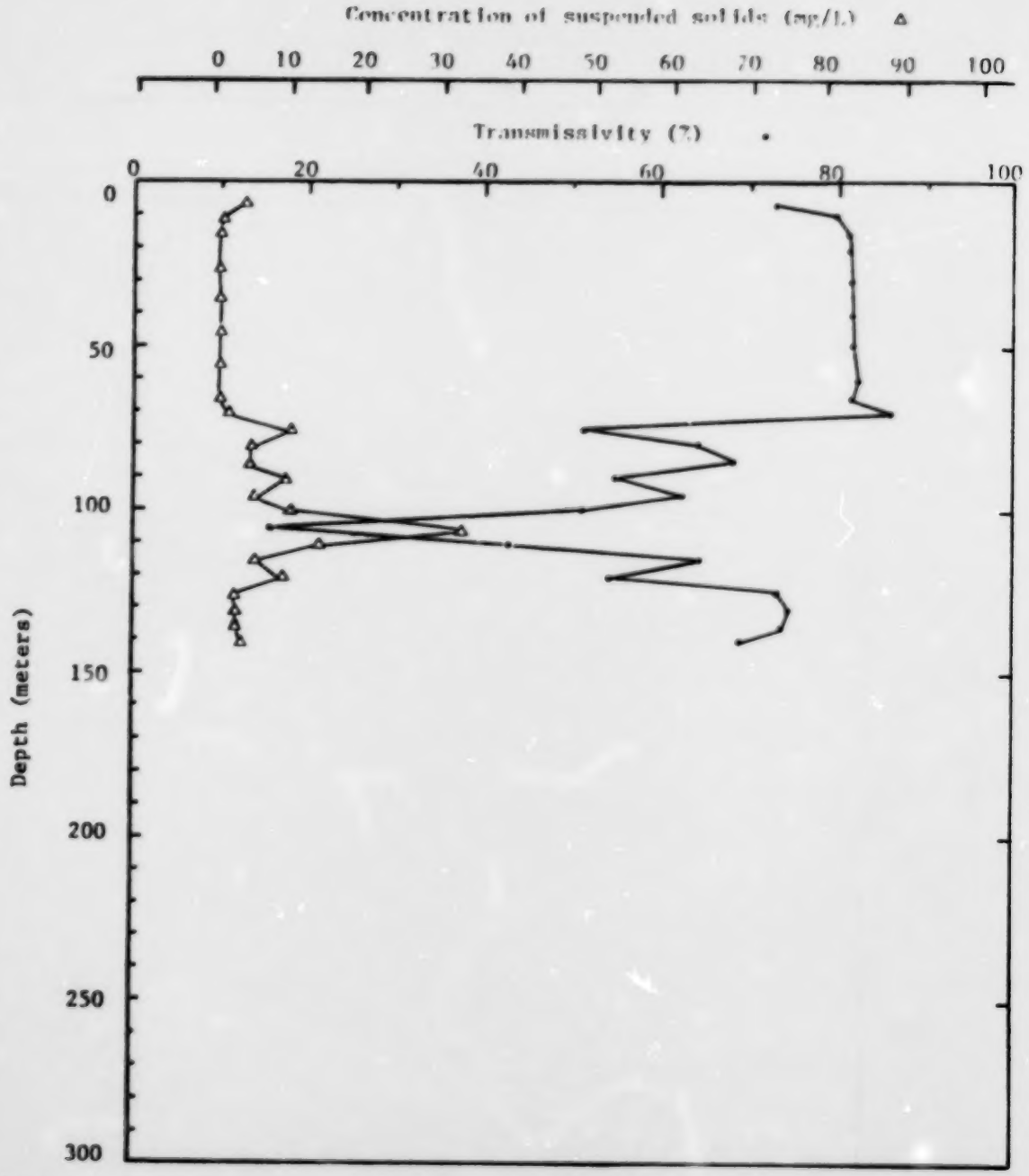
Survey Area : ALICE ARM
Station : L-9 (153-140m)

Date : 25/09/82
Time : (1112-1125) PST



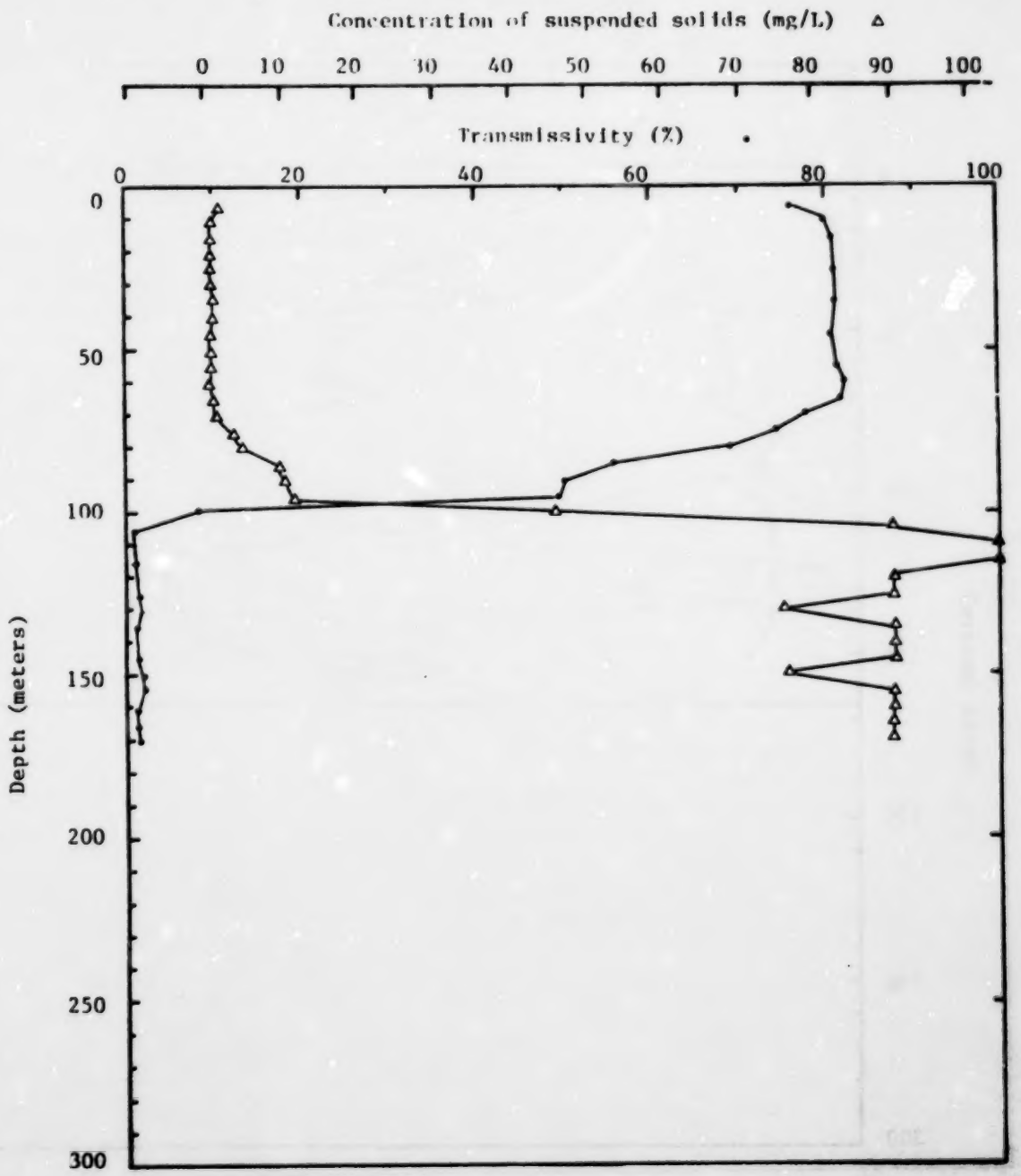
Survey Area : ALICE ARM
Station : N-10 BOTTOM DEPTH (150m)

Date : 25/09/82
Time : 1112-1125



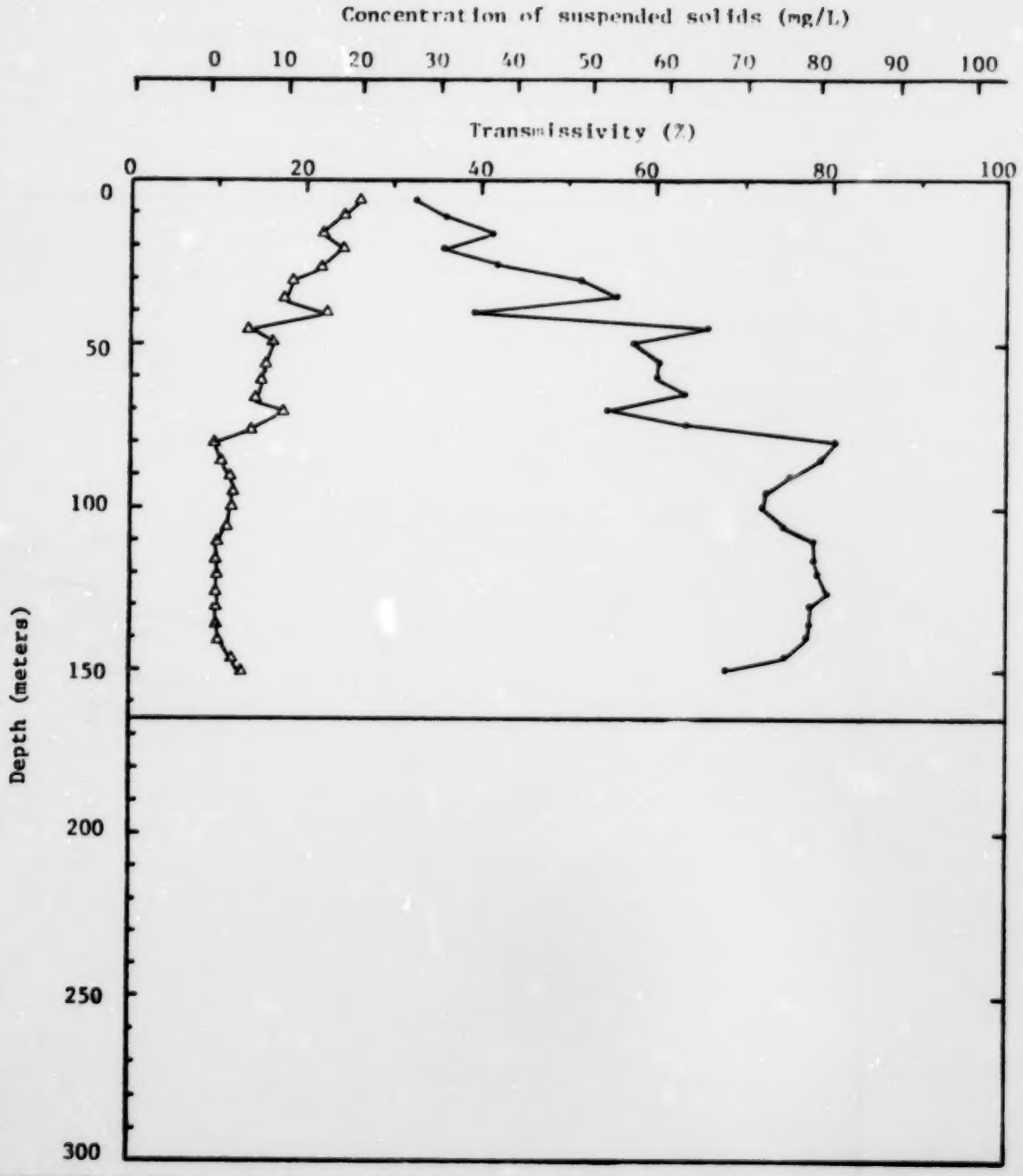
Survey Area : ALICE ARM
Station : M-11 (179m)

Date : 25/09/82
Time : 1129-1142



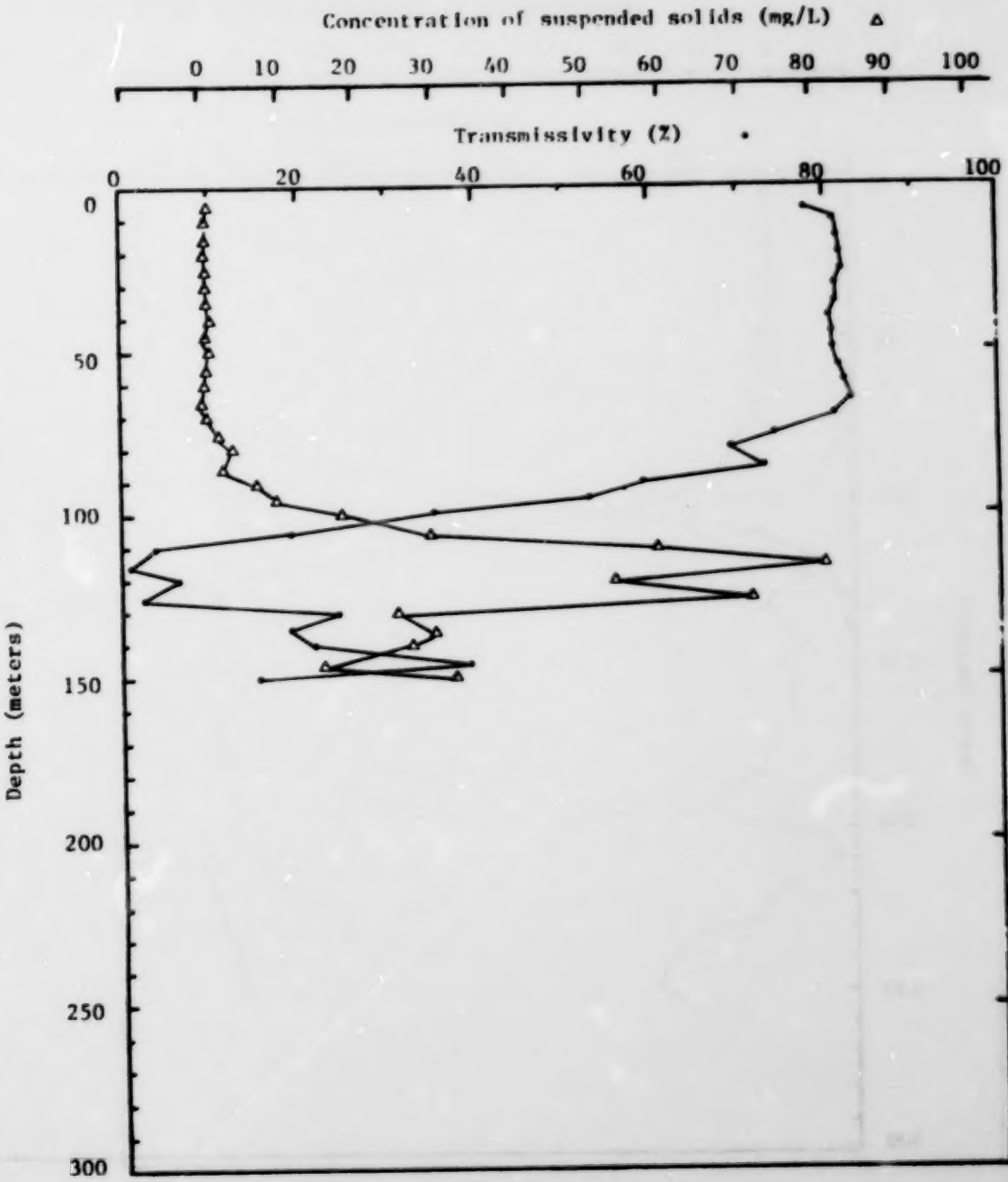
Survey Area : ALICE ARM
Station : P12 (165m)

Date : 25/09/82
Time : 1157-1208



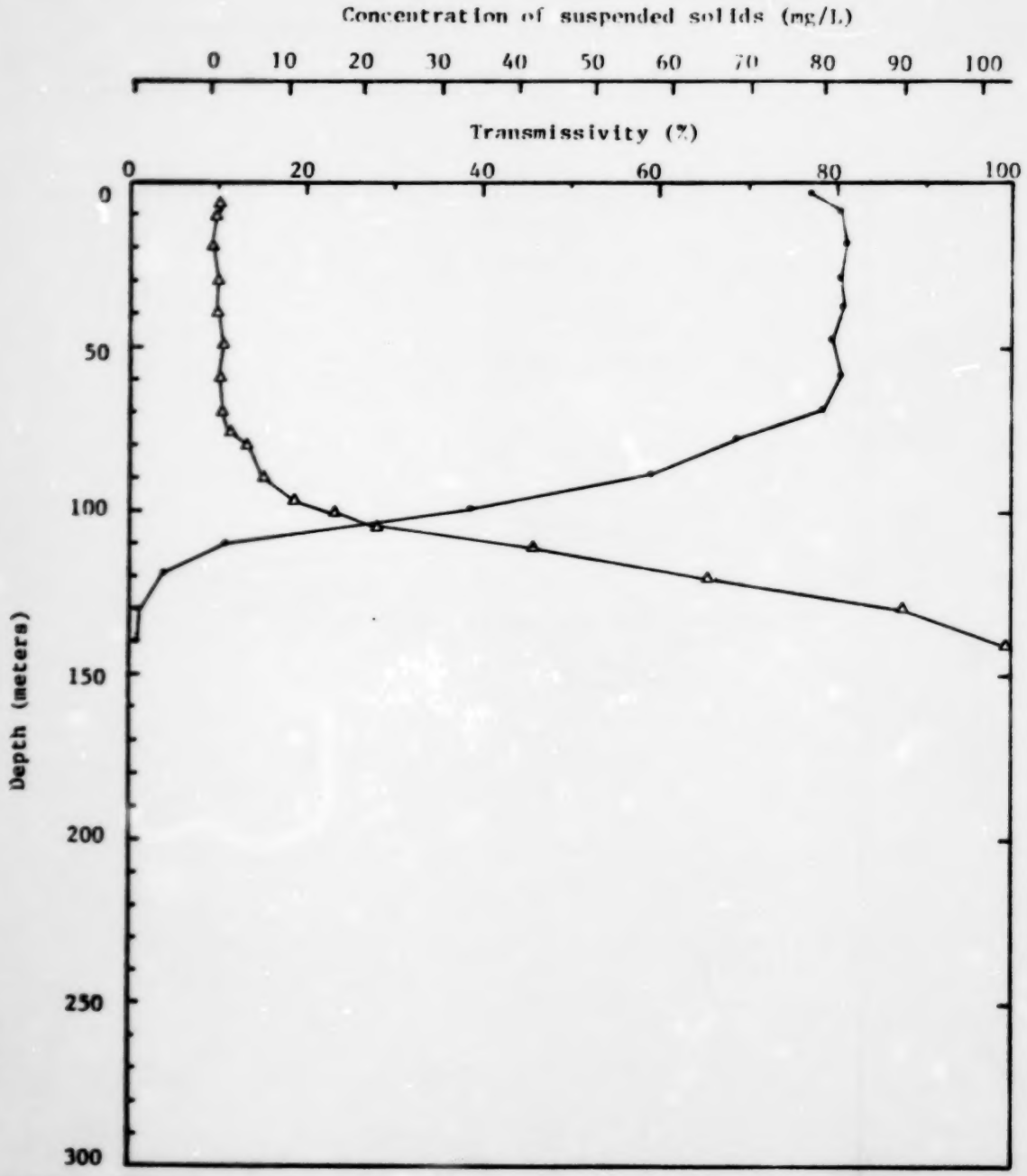
Survey Area : ALICE ARM
Station : 0-13 (Bottom 175-155-168)

Date : 25/09/82
Time : 1225-1234



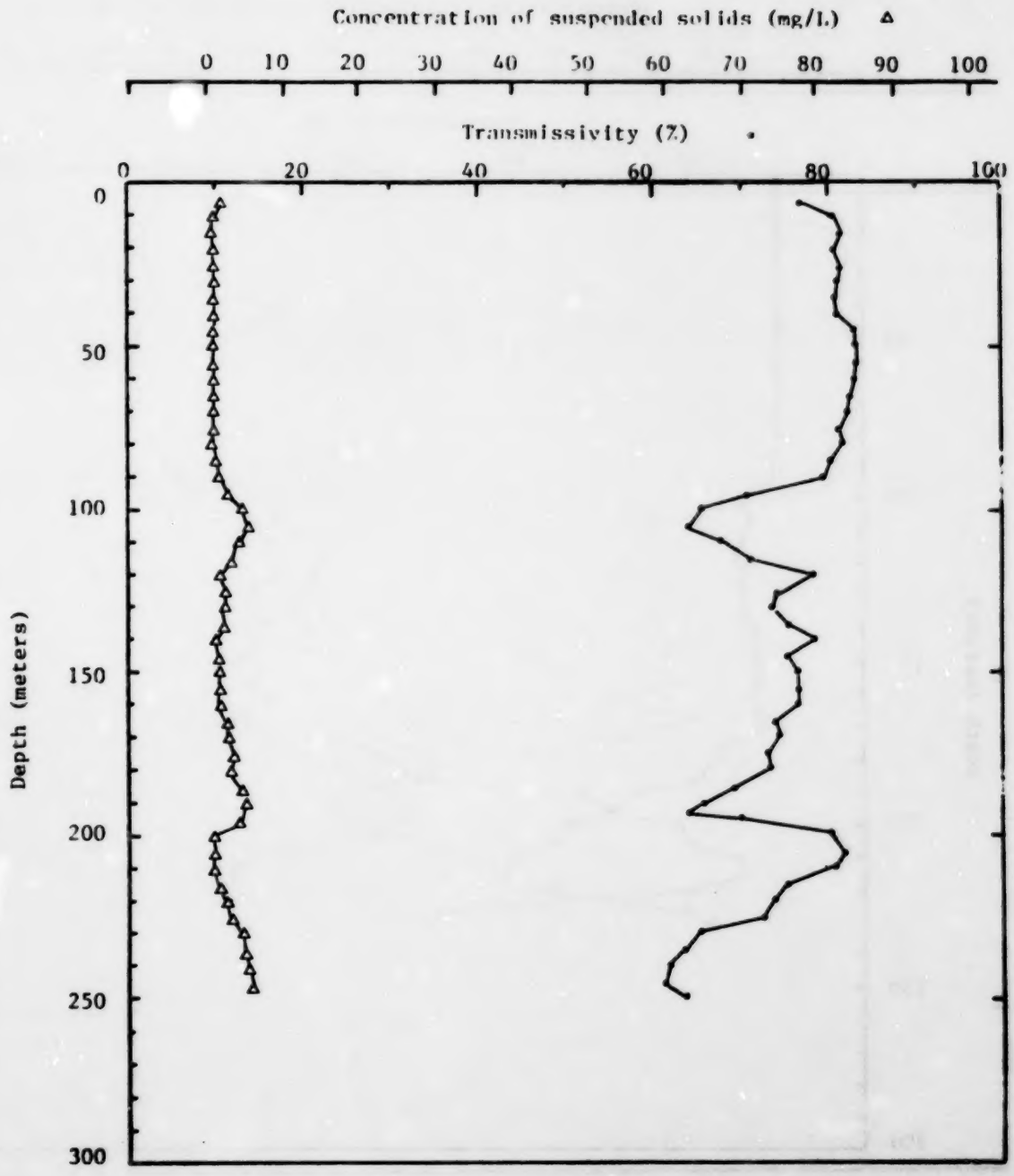
Survey Area : ALICE ARM
Station : N-14 (120-164m)

Date : 25/09/82
Time : 1250-1259 PST



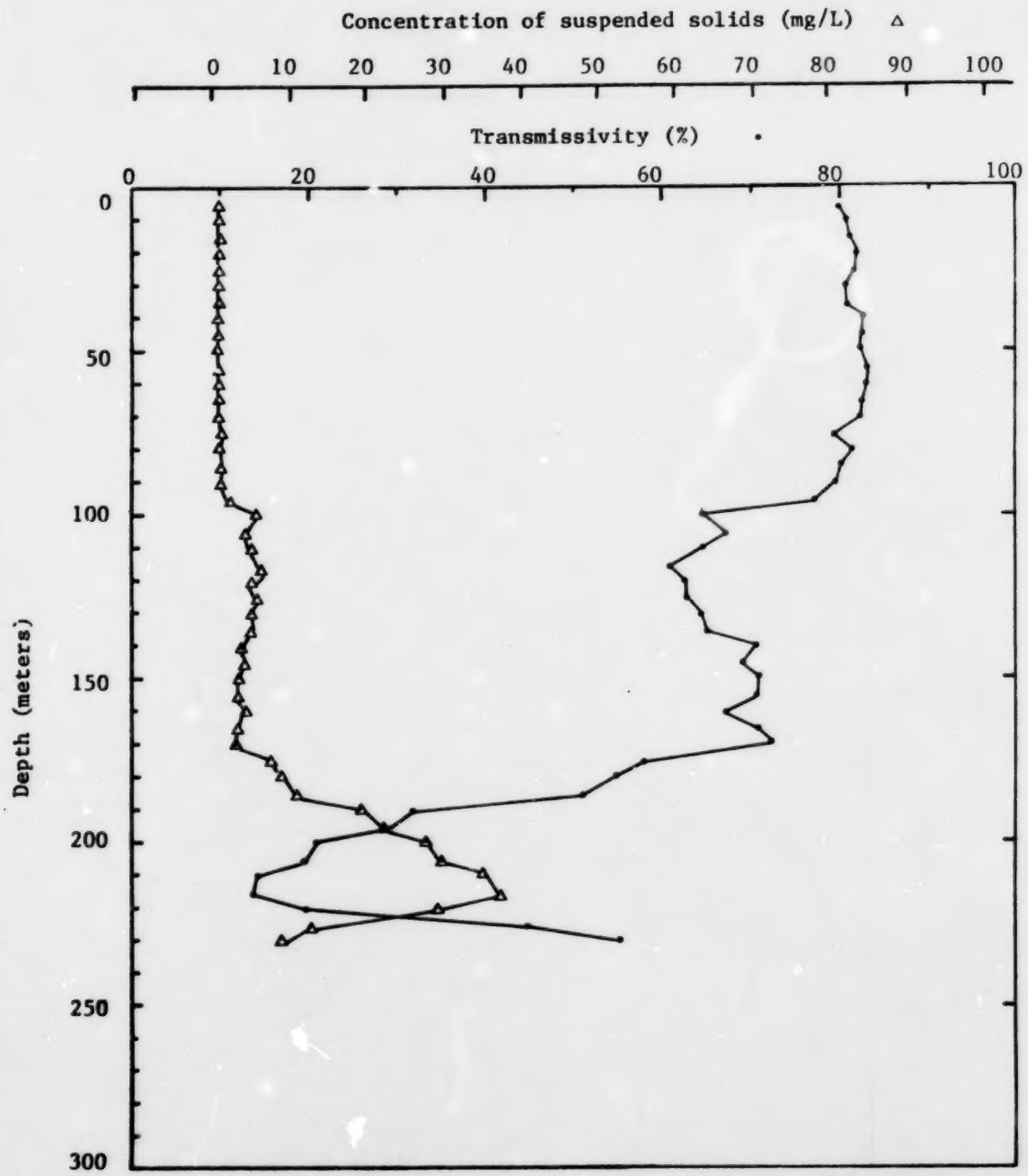
Survey Area : ALICE ARM
Station : R-16

Date : 25/09/82
Time : 1328-1343


Concentration of suspended solids (mg/L) △
0 10 20 30 40 50 60 70 80 90 100
Transmissivity (%) •
0 20 40 60 80 100
Depth (meters)
0 50 100 150 200 250 300

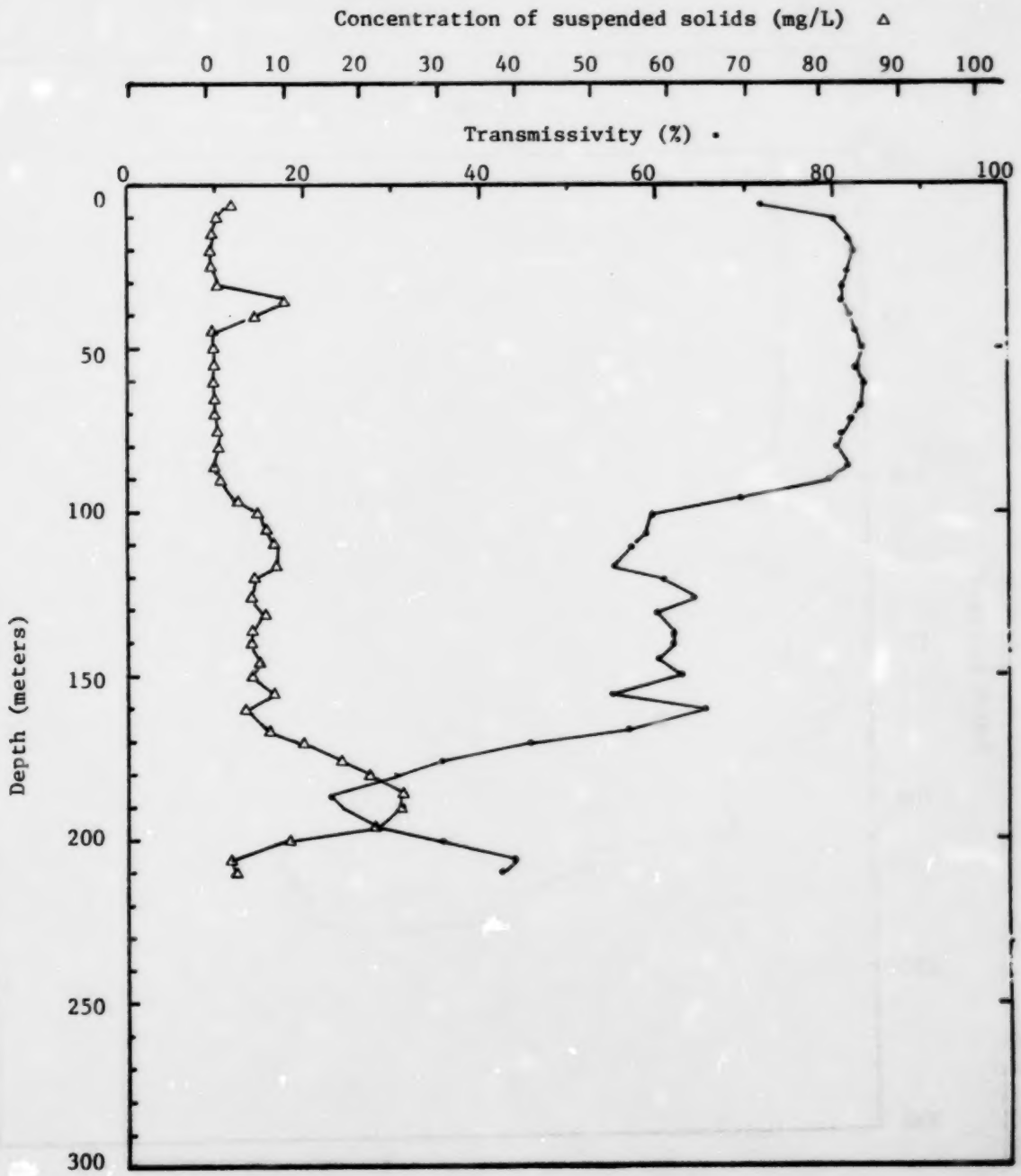
Survey Area : ALICE ARM
Station : Q16 (246m)

Date : 25/09/82
Time : 1413-1425



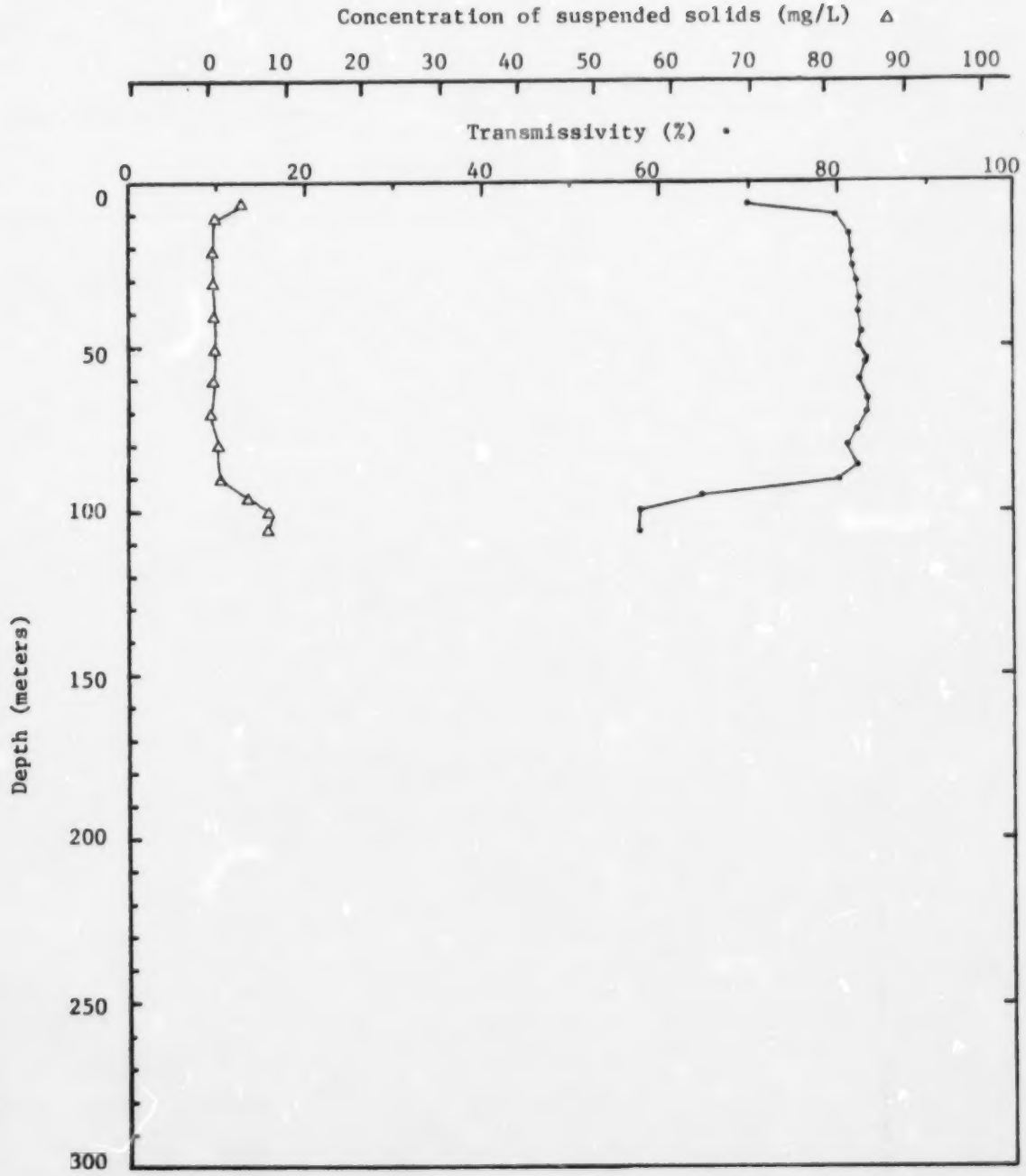
Survey Area : ALICE ARM
Station : P-16 (187-240m)

Date : 25/09/82
Time : 1457-1510


Concentration of suspended solids (mg/L) Δ
0 10 20 30 40 50 60 70 80 90 100
Transmissivity (%) •
0 20 40 60 80 100
Depth (meters)
0 50 100 150 200 250 300

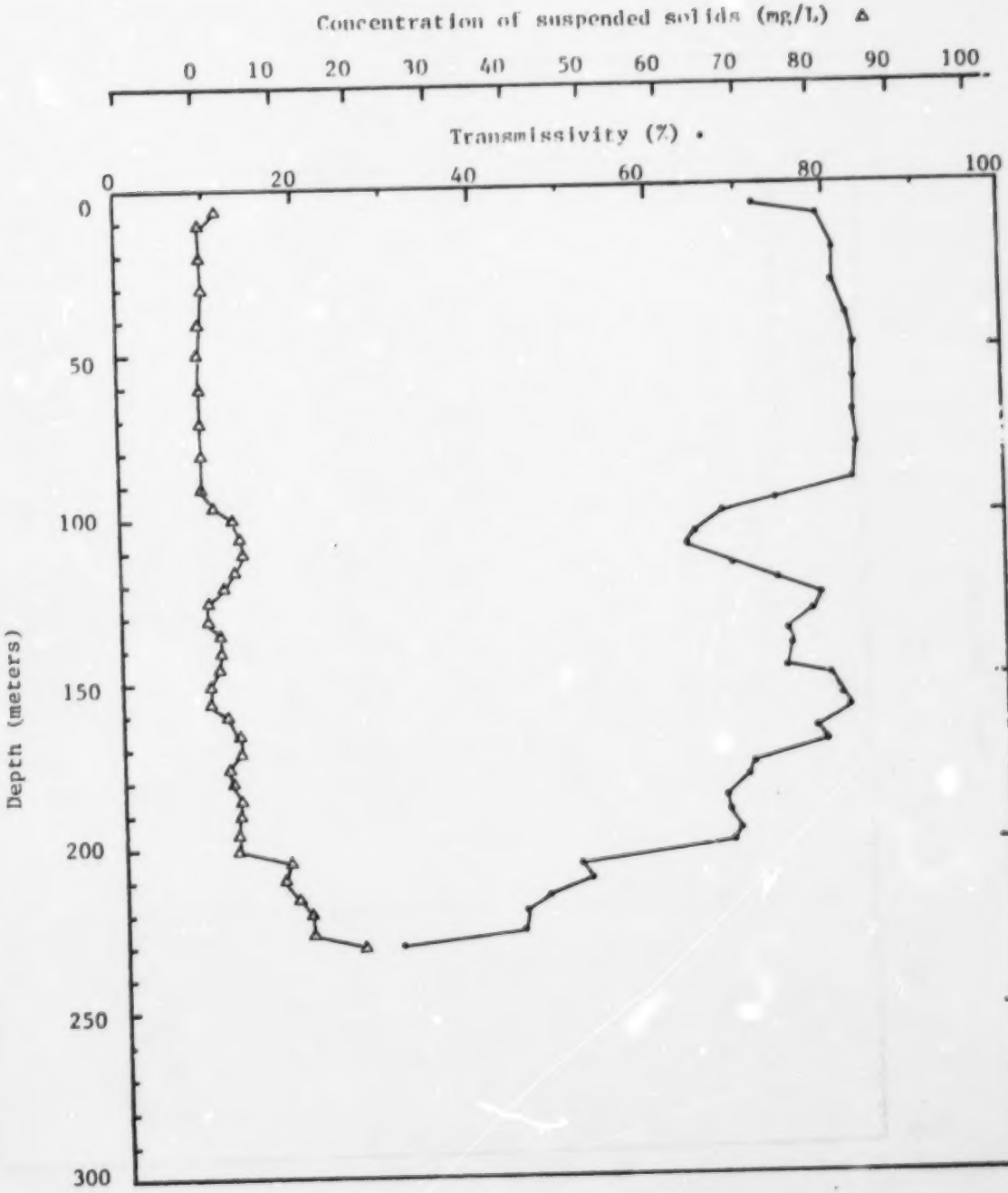
Survey Area : ALICE ARM
Station : 0-16 (110m)

Date : 25/09/82
Time : 1526-1532



Survey Area : ALICE ARM
Station : ONE CABLE W OF ST-4 (247-237m)

Date : 25/09/82
Time : (1600-1615)


Concentration of suspended solids (mg/L) Δ
0 10 20 30 40 50 60 70 80 90 100
Transmissivity (%) •
0 20 40 60 80 100
Depth (meters)
0 50 100 150 200 250 300

Survey Area : ALICE ARM
Station : M-11 (168m)

Date : 26/09/82
Time : (2000-2017)

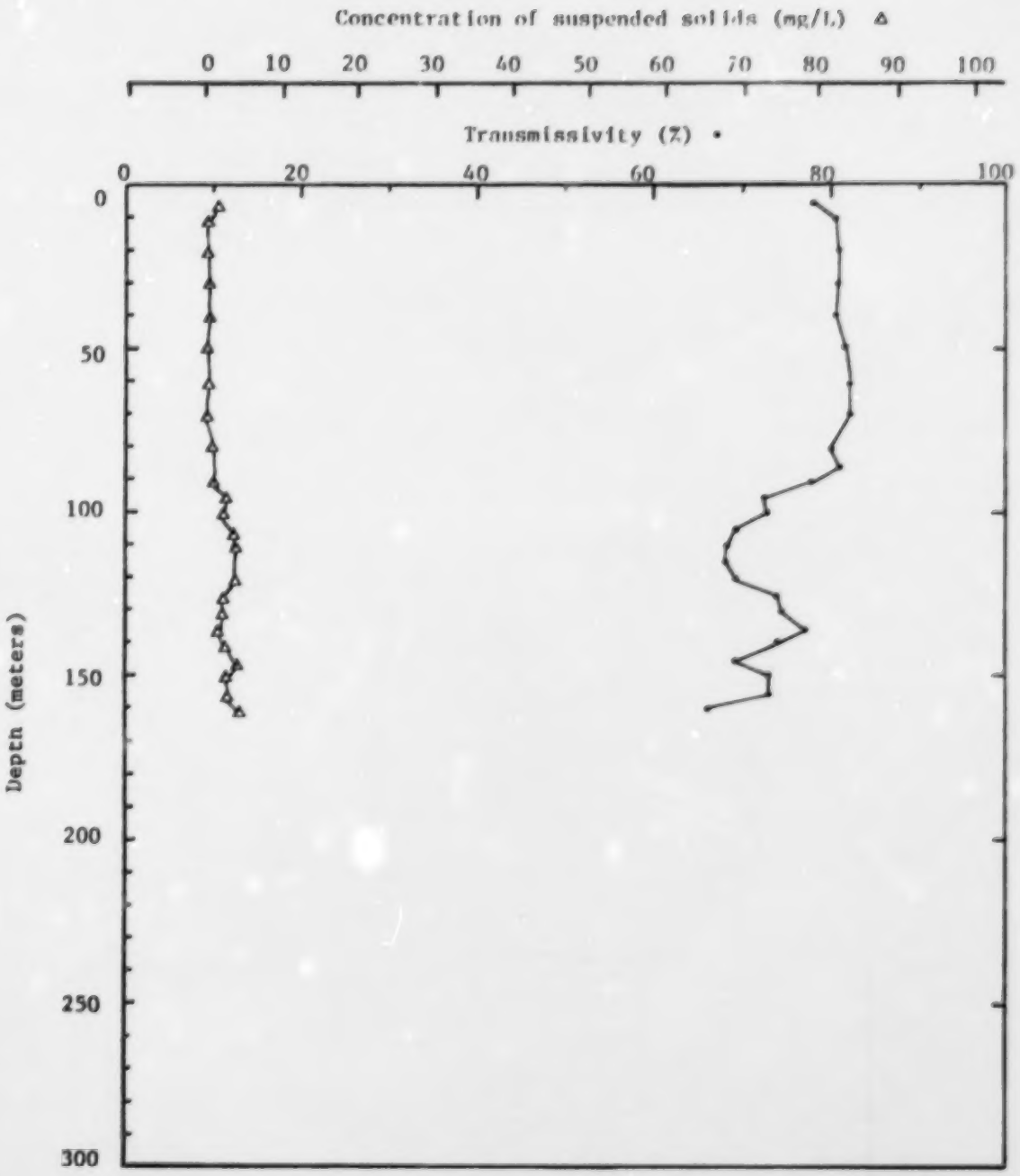


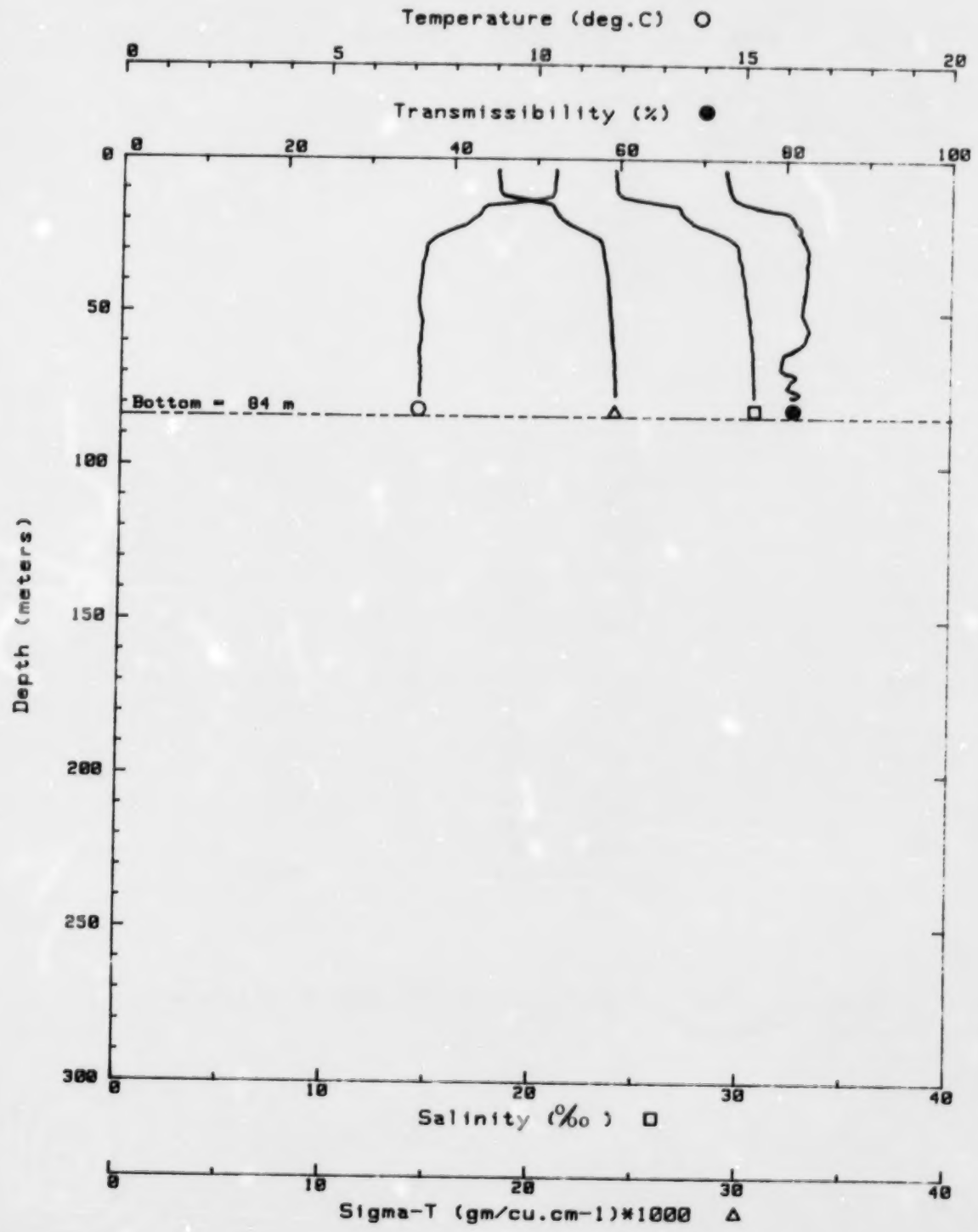
TABLE 9. STATIONS AT WHICH CTD %T PROFILES WERE RUN [1]

STATION	DATE	TIME (Z+8)	DEPTH m	CALIBRATION READING Hz	%T	Partic. Conc. mgL^{-1}
AA-1	27/09/82	1045	84			
AA-2	"	0820	205			
AA-3	26/09/82	1800	386			
AA-4	"	1000	278			
AA-5	"	0930	102			
HA-3	27/09/82	1620	293			
HA-5	"	1851	97			
GB-1	28/09/82	0813	113			
OB-6	"	0956	241			
OB-4	"	1320	525			
OB-2	"	1718	428			
PI-2	"	2055	540			
S-19	30/09/82	1040	247			
R-19	"	1100	267	1446	77.0	1.25
Q-19	"	1115	260	1465	67.5	3.78
P-19	"	1130	241	1495	52.5	8.41
O-19	"	1150	141	1433	83.5	0.53
R-16	"	1235	245	1465	67.5	3.19
Q-16	"	1255	250	1500	50.0	14.63
Q-16	"	1340	237			
P-16	"	1400	187	1561	19.5	34.01
				1490	55.0	6.83
O-16	"	1425	110	1478	61.00	4.41
P-12	"	1450	180	1512	44.0	12.44
O-13	"	1550	187	1570	15.0	27.67
N-14	"	1615	104	1516	42.0	10.74
N-10	"	1645	152	1596	2.0	79.76
M-11	"	1710	175	1492	54.0	13.43
N-7	"	1755	86			
M-8	"	1810	120			
L-9	"	1820	154	1544	28.0	18.35

[1] Complete record at approximately 1m intervals is on file at Ocean Chemistry

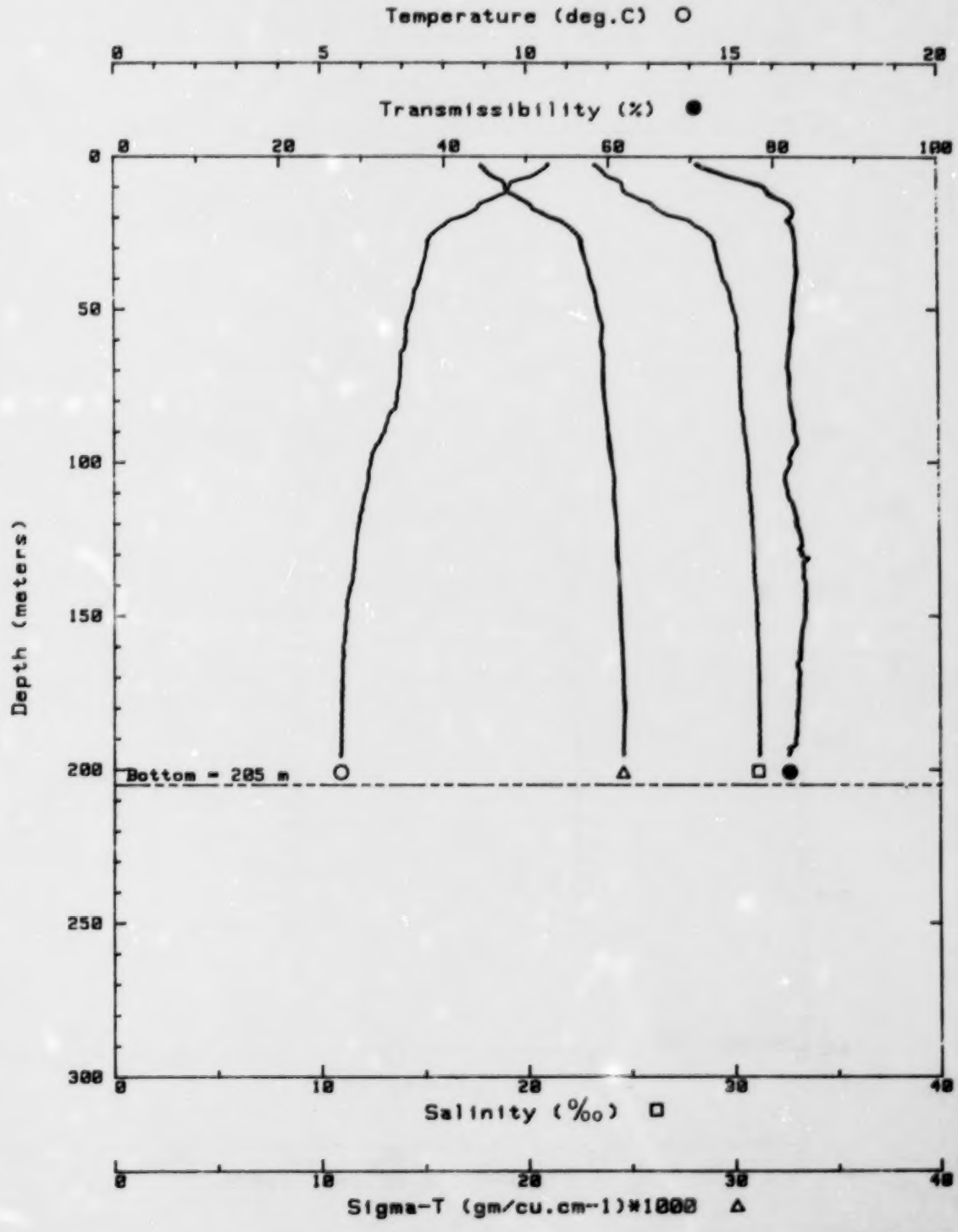
Survey Area : ALICE ARM
Station : AA1

Date : 82/09/27
Time : 1045 PST



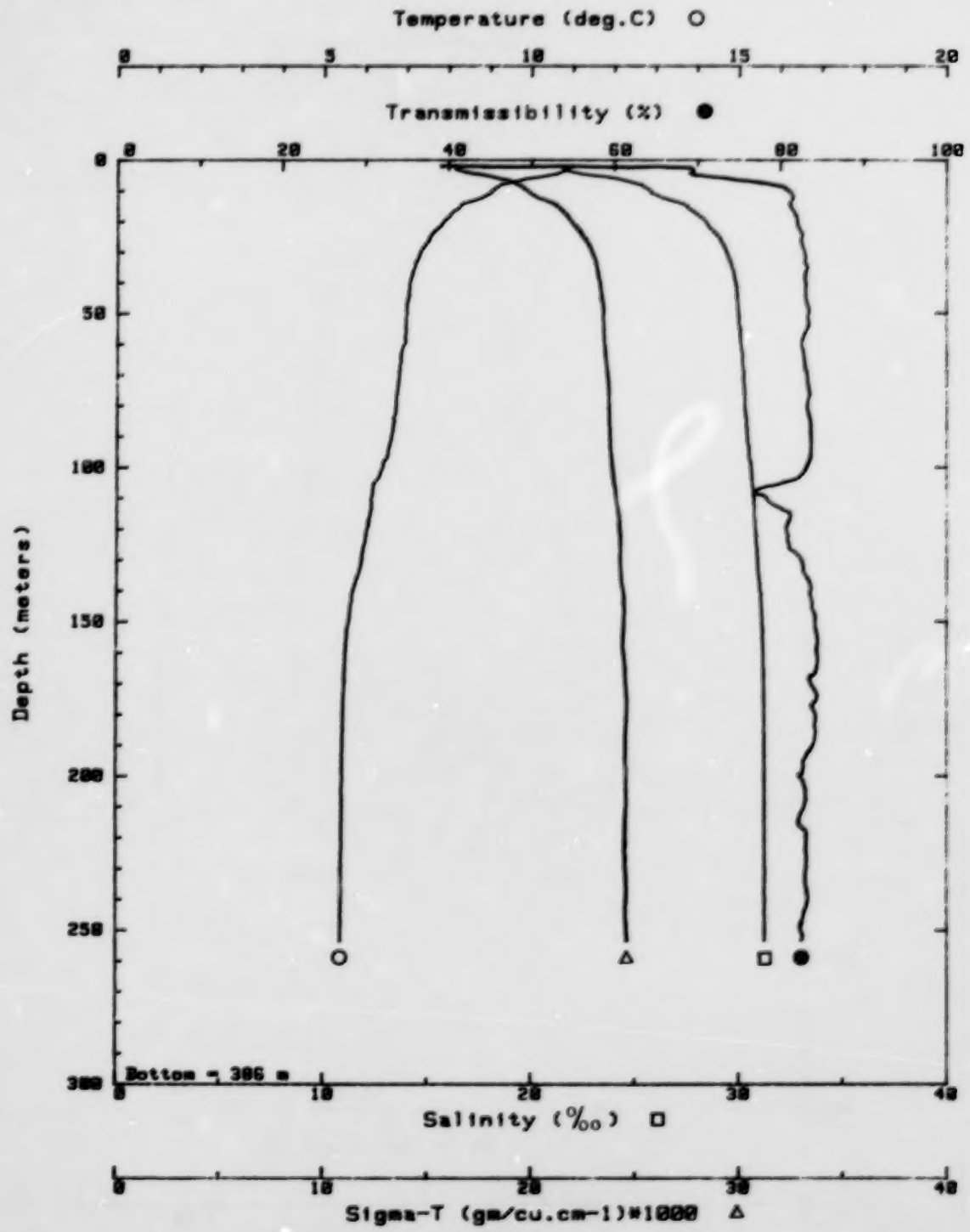
Survey Area : ALICE ARM
Station : AA2

Date : 82/09/27
Time : 0820 PST



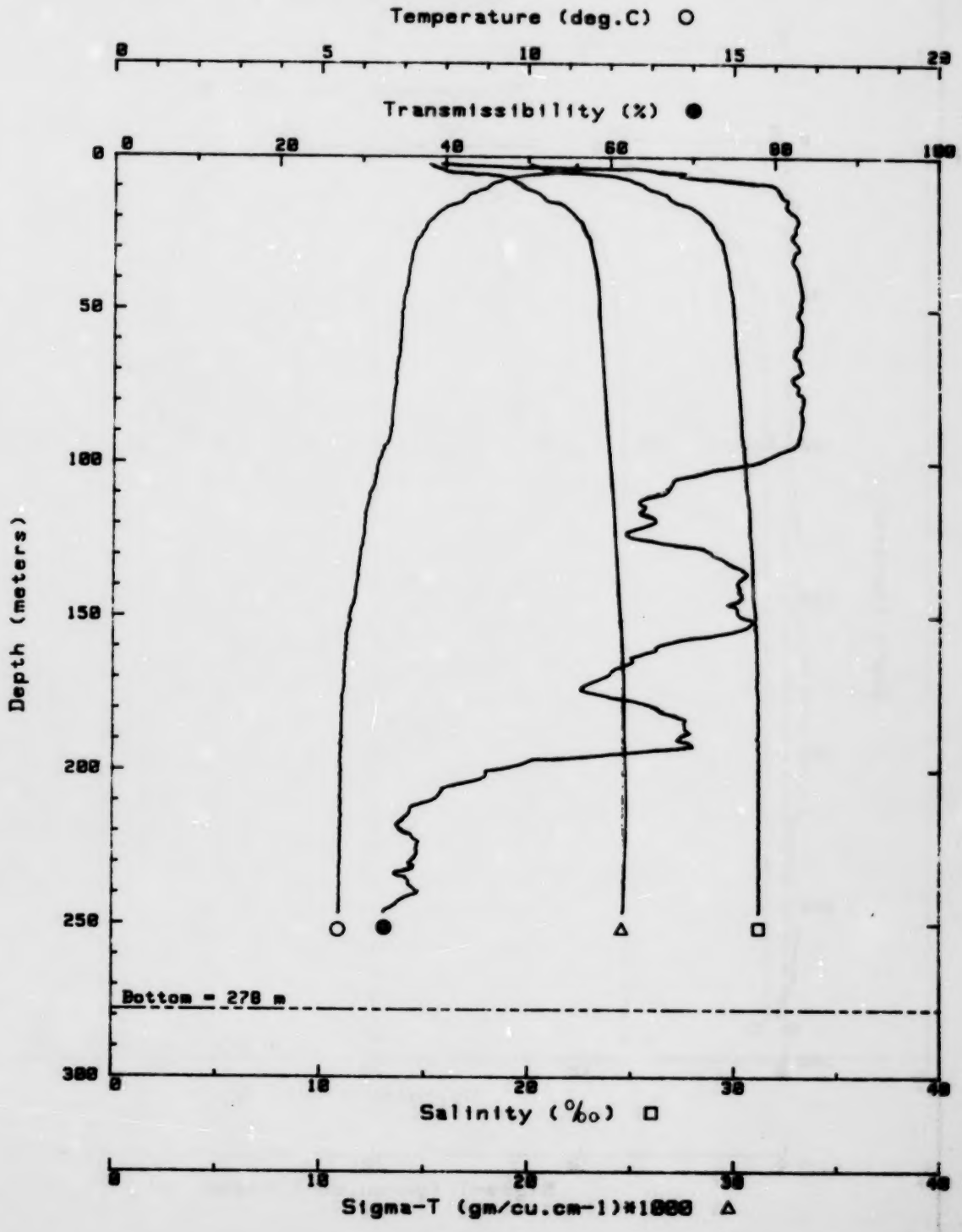
Survey Area : ALICE ARM
Station : AA3

Date : 82/09/26
Time : 1800 PST



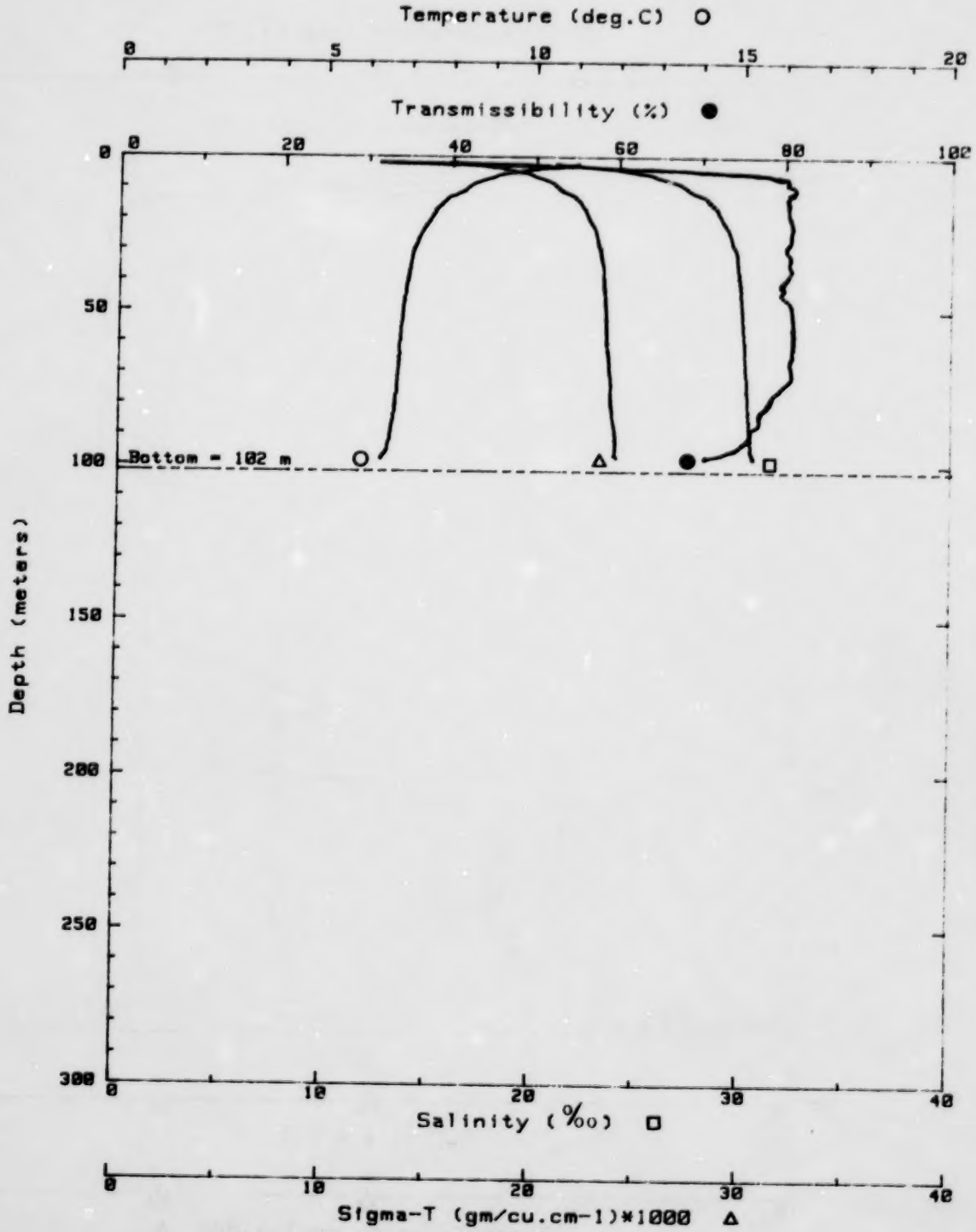
Survey Area : ALICE ARM
Station : AA-4

Date : 82/09/26
Time : 1002 PST



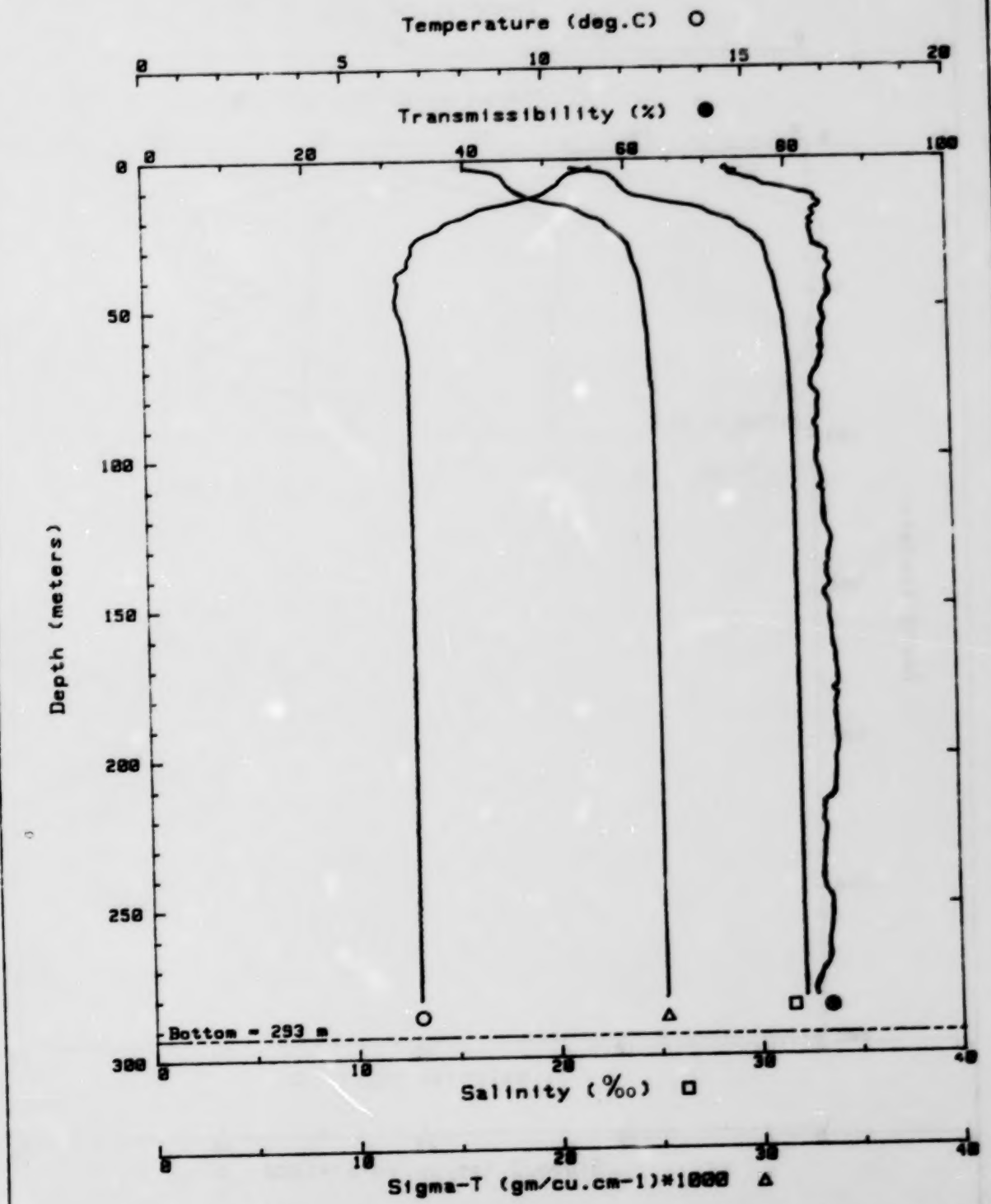
Survey Area : ALICE ARM
Station : AA-5

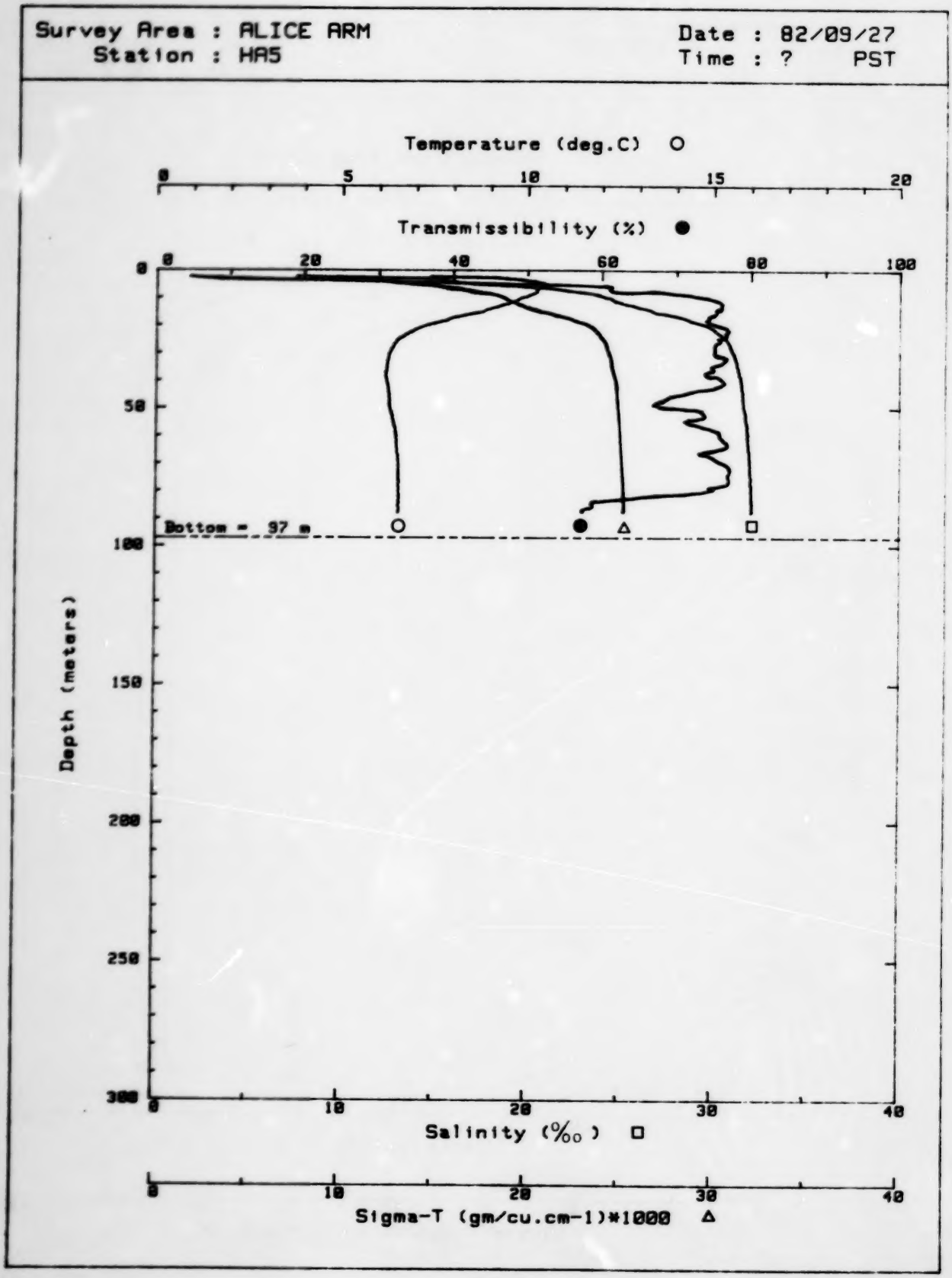
Date : 82/09/26
Time : 0930 PST



Survey Area : ALICE ARM
Station : HA3

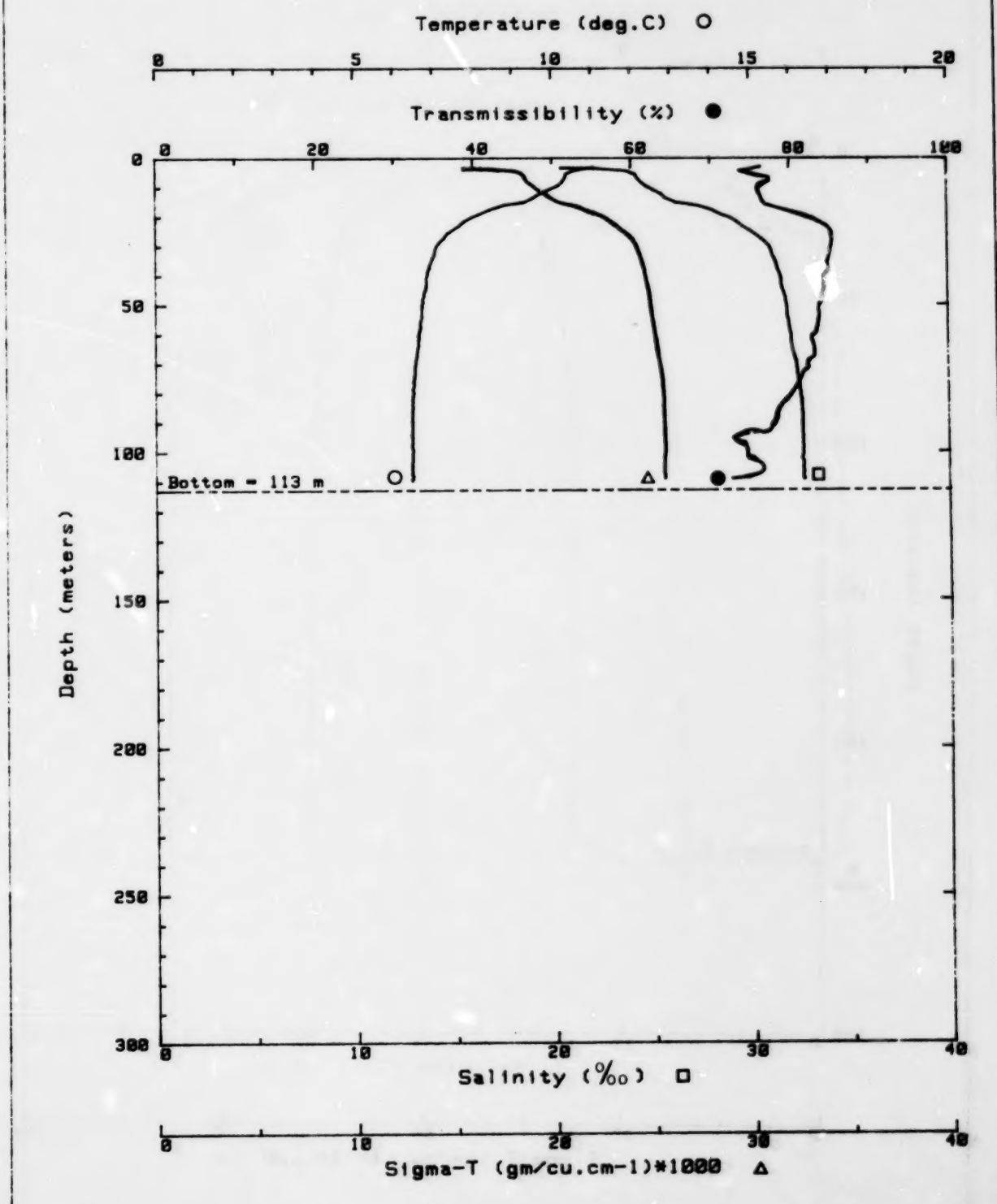
Date : 82/09/27
Time : 1620 PST




Survey Area : ALICE ARM
Station : HA5
Date : 82/09/27
Time : ? PST
Temperature (deg.C) O
0 5 10 15 20
Transmissibility (%) ●
0 20 40 60 80 100
0
50
100
150
200
250
300
Bottom = 97 m
Depth (meters)
0 10 20 30 40
Salinity (‰) □
0 10 20 30 40
Sigma-T (gm/cu.cm-1)*1000 △

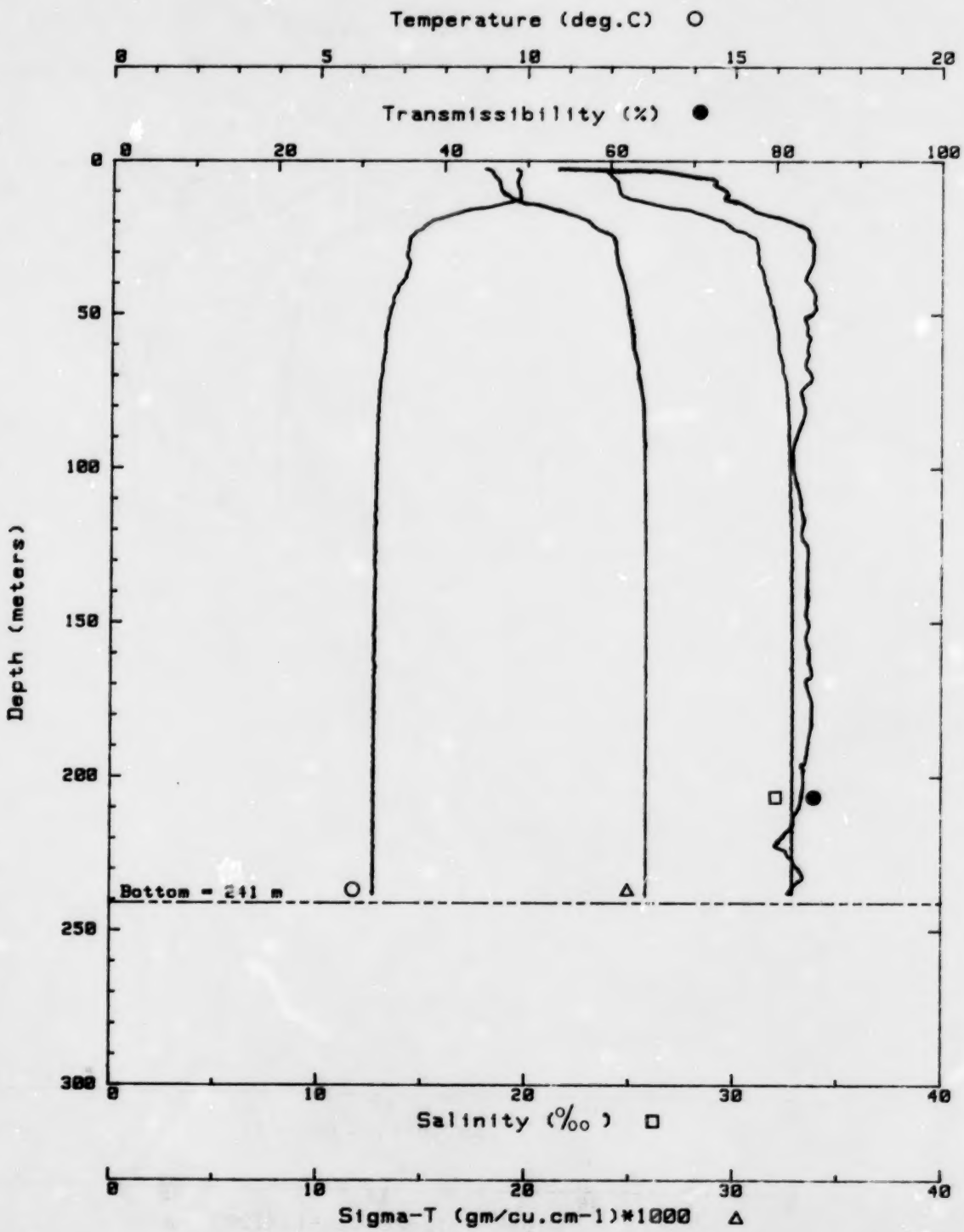
Survey Area : ALICE ARM
Station : GR-1

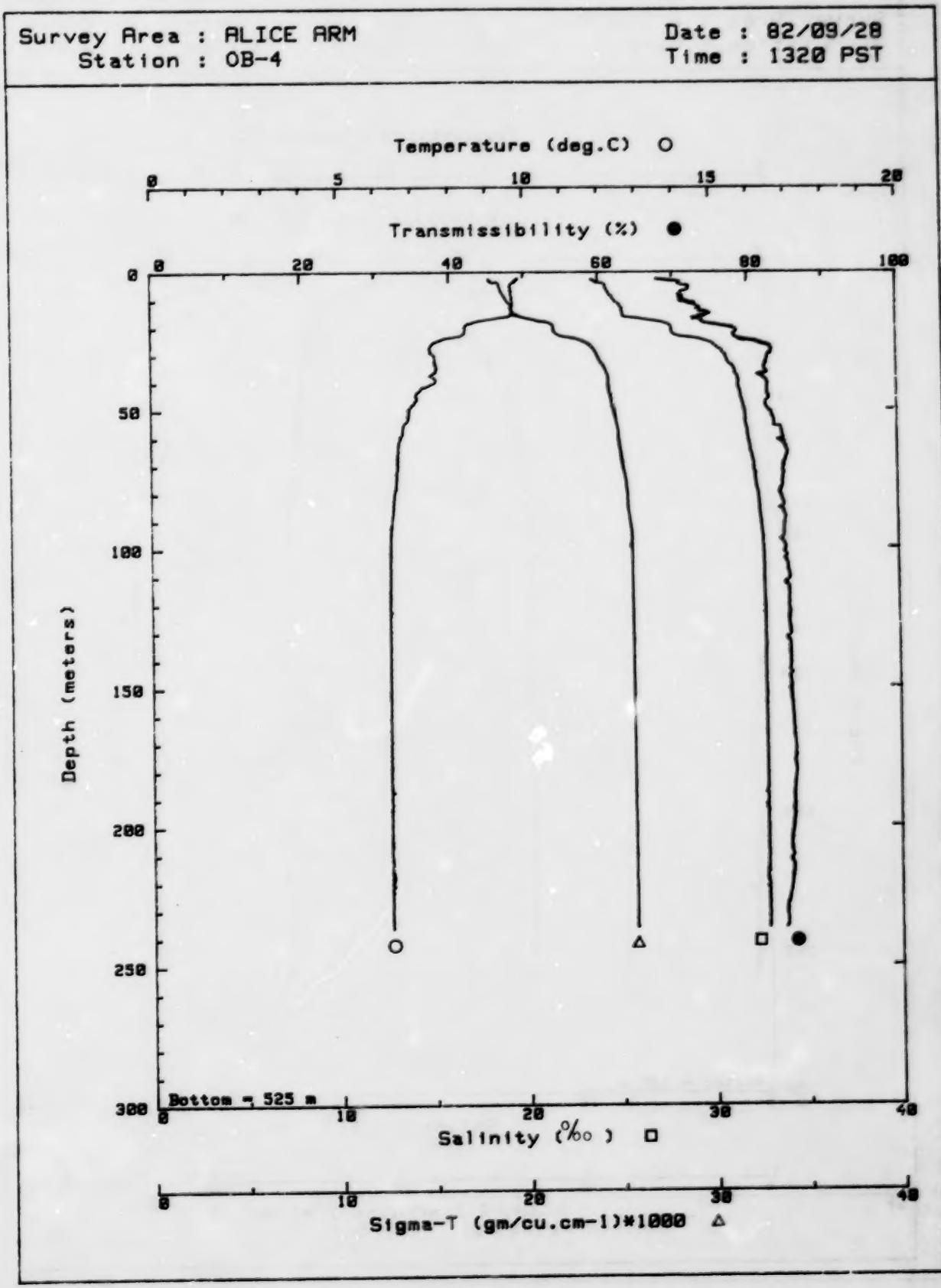
Date : 82/09/28
Time : 0813 PST

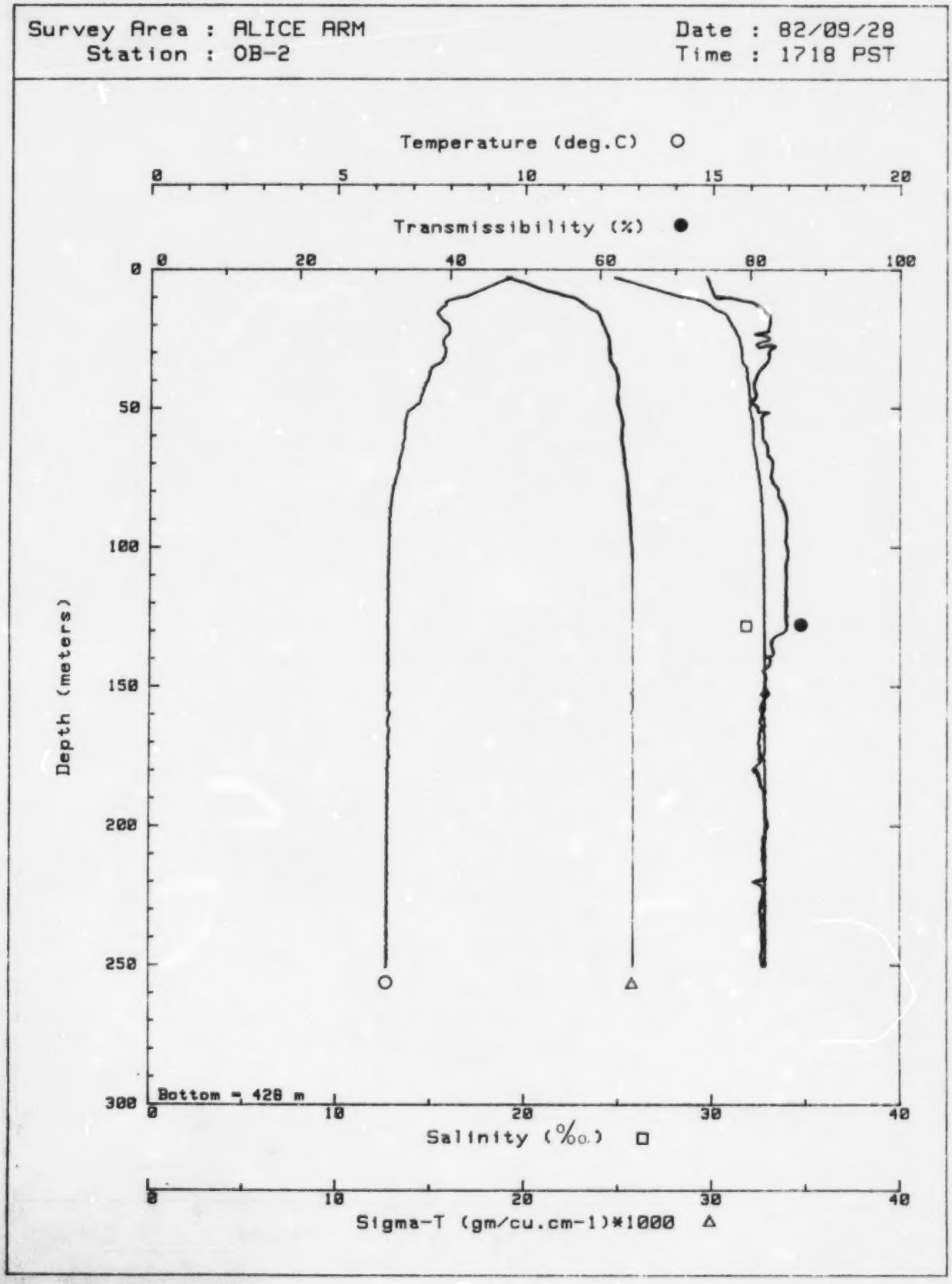


Survey Area : ALICE ARM
Station : OB-6

Date : 82/09/28
Time : 0956 PST

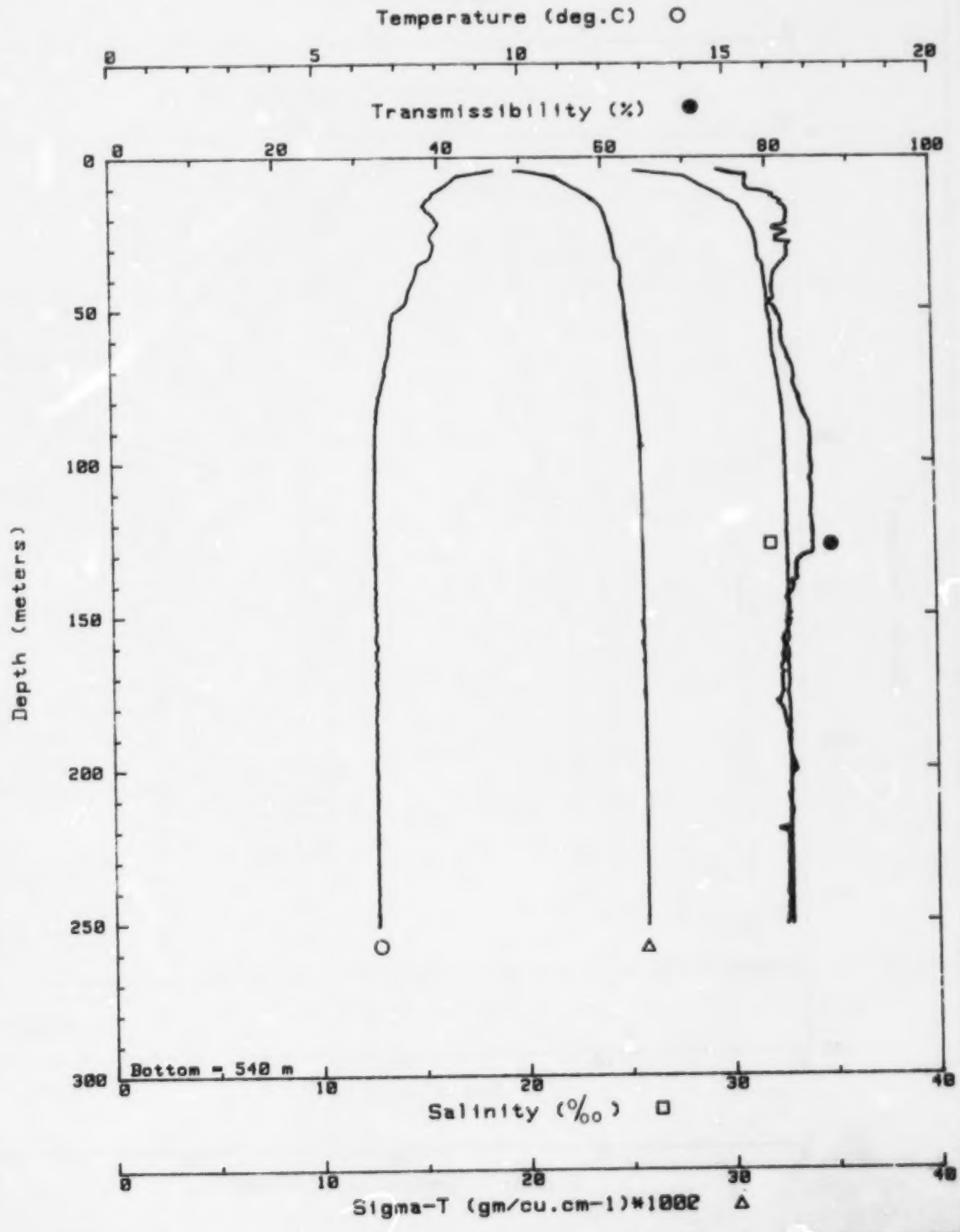



Survey Area : ALICE ARM
Station : OB-4
Date : 82/09/28
Time : 1320 PST
Temperature (deg.C) ○
0
5
10
15
20
Transmissibility (%) ●
0
20
40
60
80
100
Depth (meters)
0
50
100
150
200
250
300
Bottom = 525 m
0
10
20
30
40
Salinity (‰) □
0
10
20
30
40
Sigma-T (gm/cu.cm-1)*1000 △


Survey Area : ALICE ARM
Station : OB-2
Date : 82/09/28
Time : 1718 PST
Temperature (deg.C) O
0 5 10 15 20
Transmissibility (%) ●
0 20 40 60 80 100
Depth (meters)
0 50 100 150 200 250 300
Bottom = 428 m
0 10 20 30 40
Salinity (‰) □
0 10 20 30 40
Sigma-T (gm/cu.cm-1)*1000 △

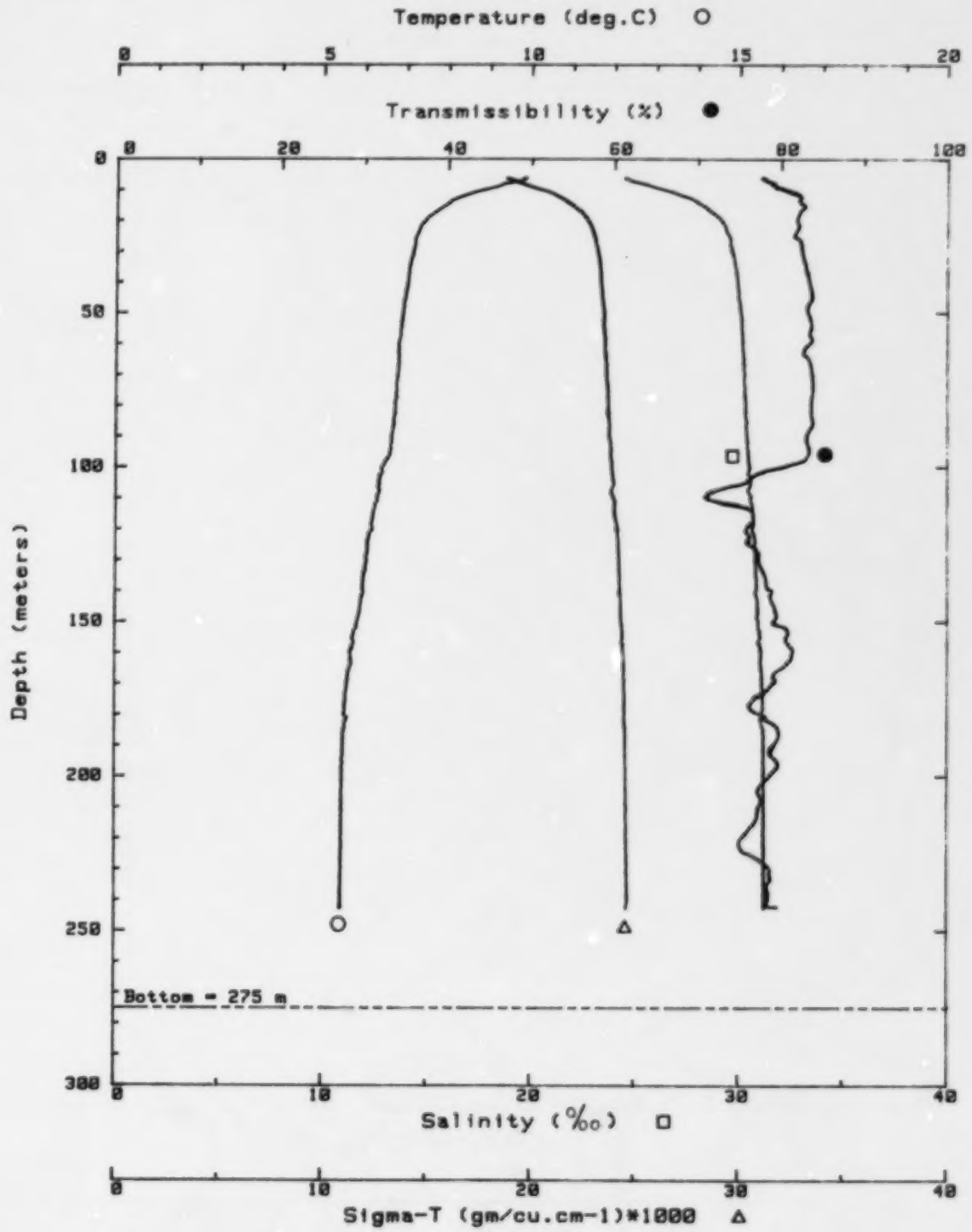
Survey Area : ALICE ARM
Station : PI-2

Date : 82/09/28
Time : 2055 PST



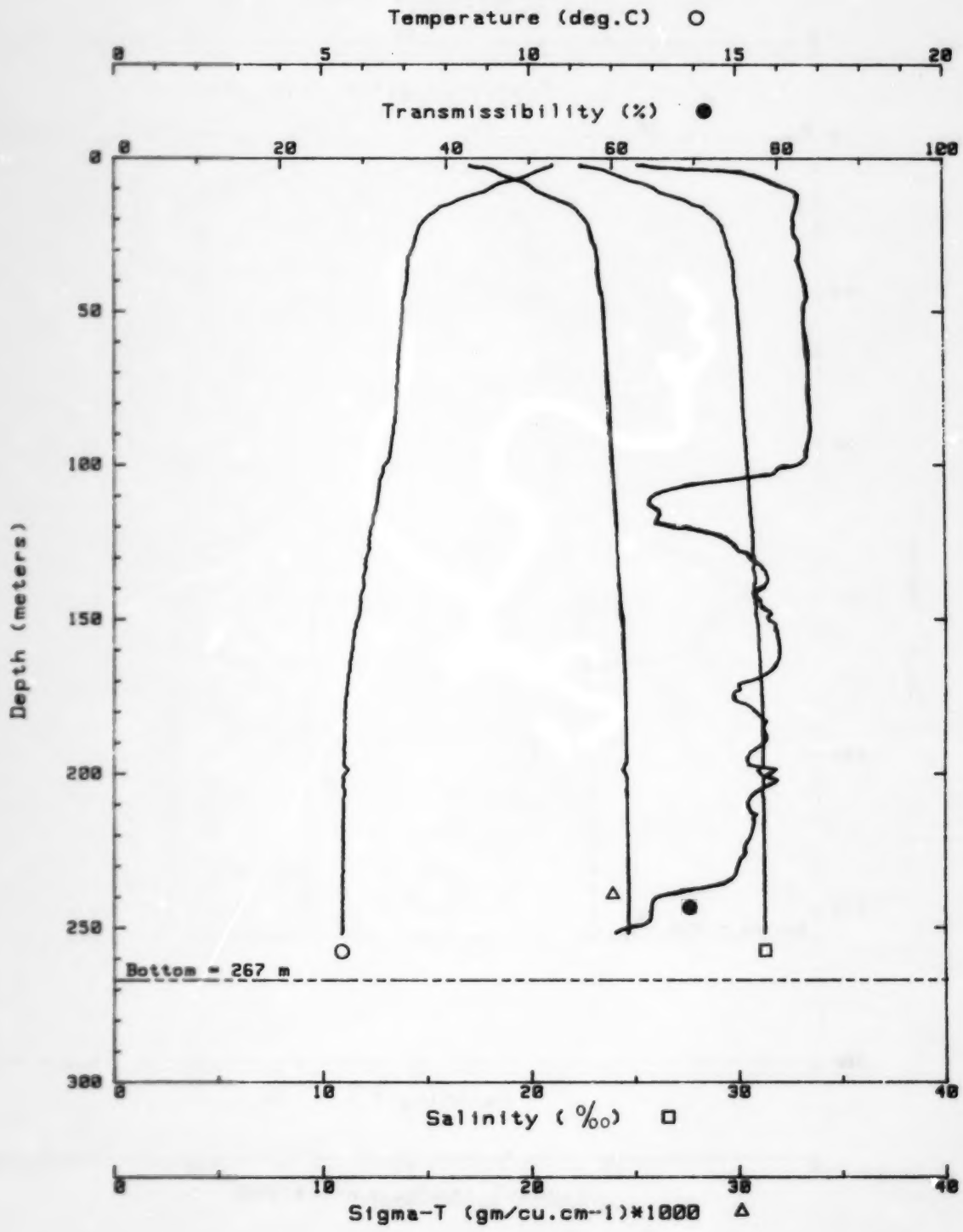
Survey Area : ALICE ARM
Station : S-19

Date : 82/09/30
Time : 1040 PST


Temperature (deg.C) ○
0 5 10 15 20
Transmissibility (%) ●
0 20 40 60 80 100
Depth (meters)
0 50 100 150 200 250 300
Bottom = 275 m
Salinity (‰) □
0 10 20 30 40
Sigma-T (gm/cu.cm-1)*1000 △
0 10 20 30 40

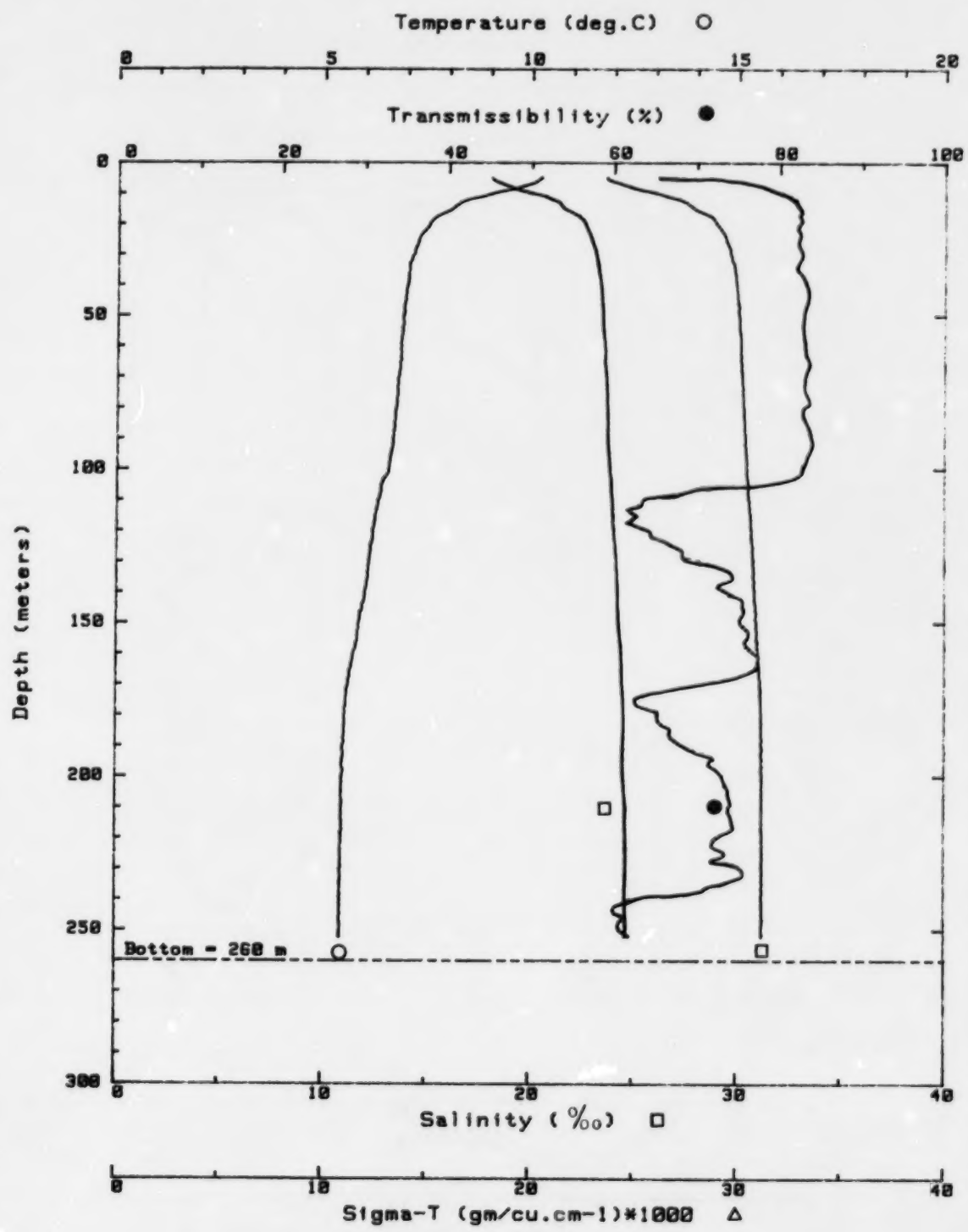
Survey Area : ALICE ARM
Station : R-19

Date : 82/09/30
Time : 1100 PST


Temperature (deg.C) ○
0 5 10 15 20
Transmissibility (%) ●
0 20 40 60 80 100
Depth (meters)
0 50 100 150 200 250 300
Bottom = 267 m
0 10 20 30 40
Salinity (‰) □
0 10 20 30 40
Sigma-T (gm/cu.cm-1)*1000 △

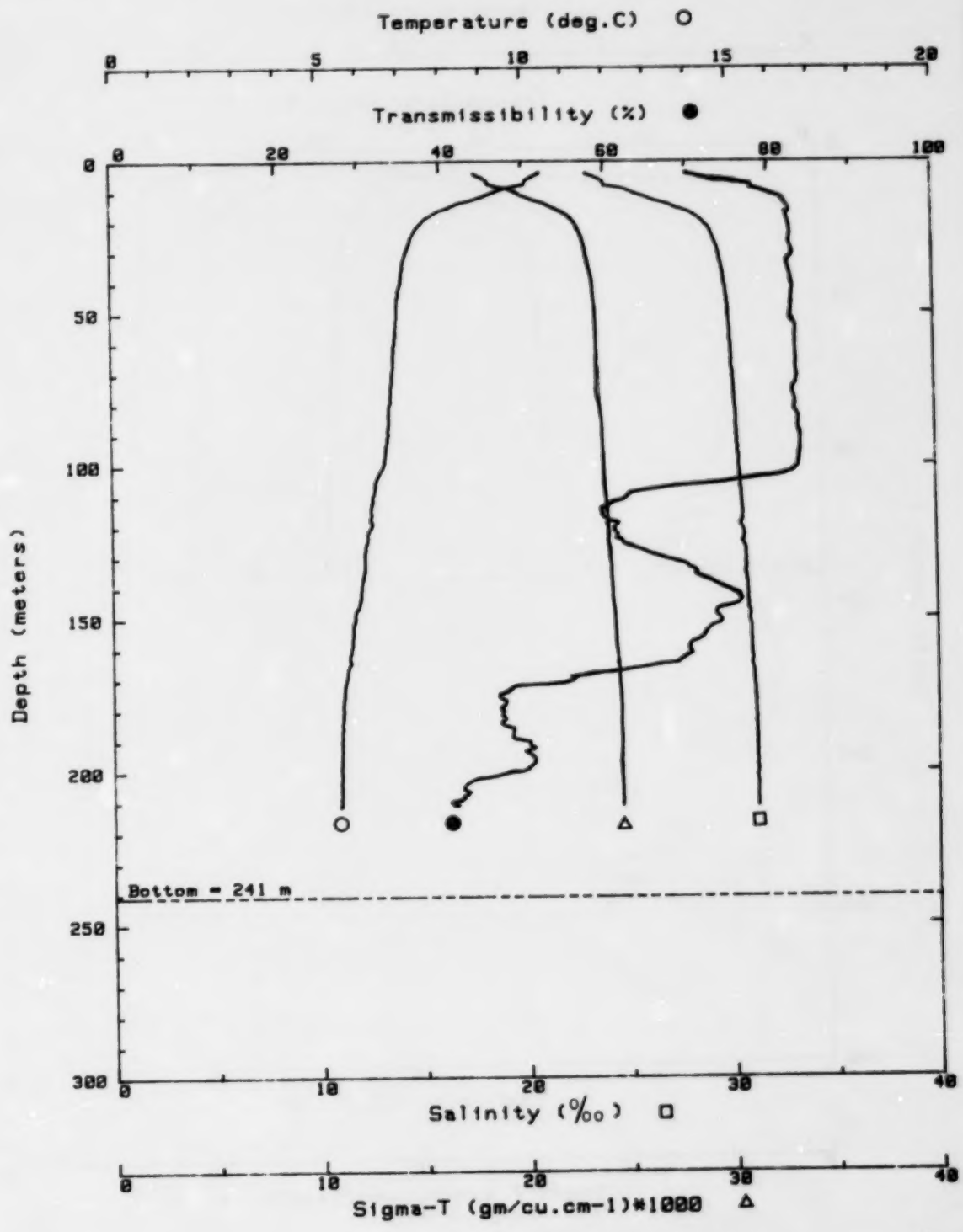
Survey Area : ALICE ARM
Station : Q-19

Date : 82/09/30
Time : 1115 PST



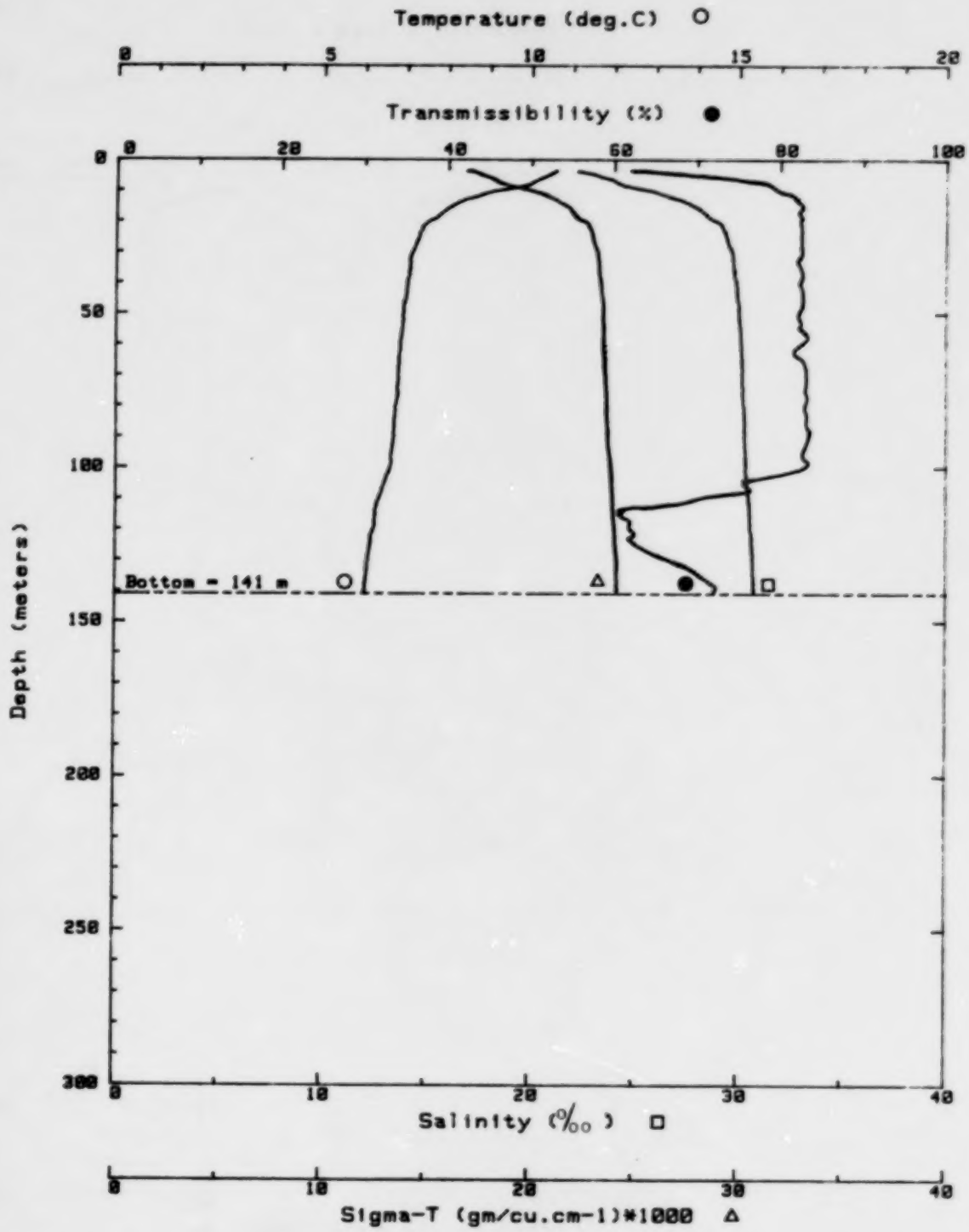
Survey Area : ALICE ARM
Station : P-19

Date : 82/09/30
Time : 1130 PST



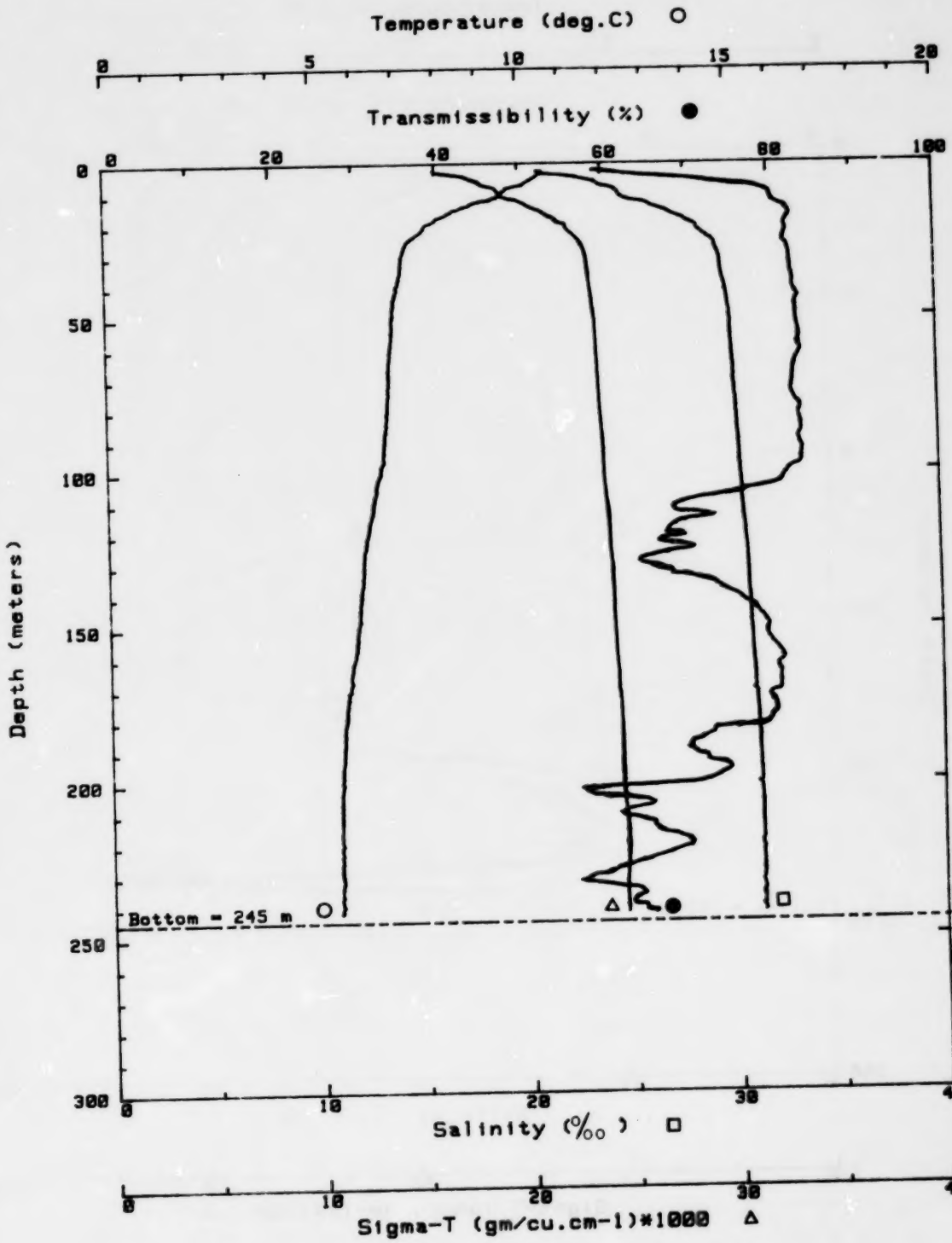
Survey Area : ALICE ARM
Station : O-19

Date : 82/09/30
Time : 1150 PST



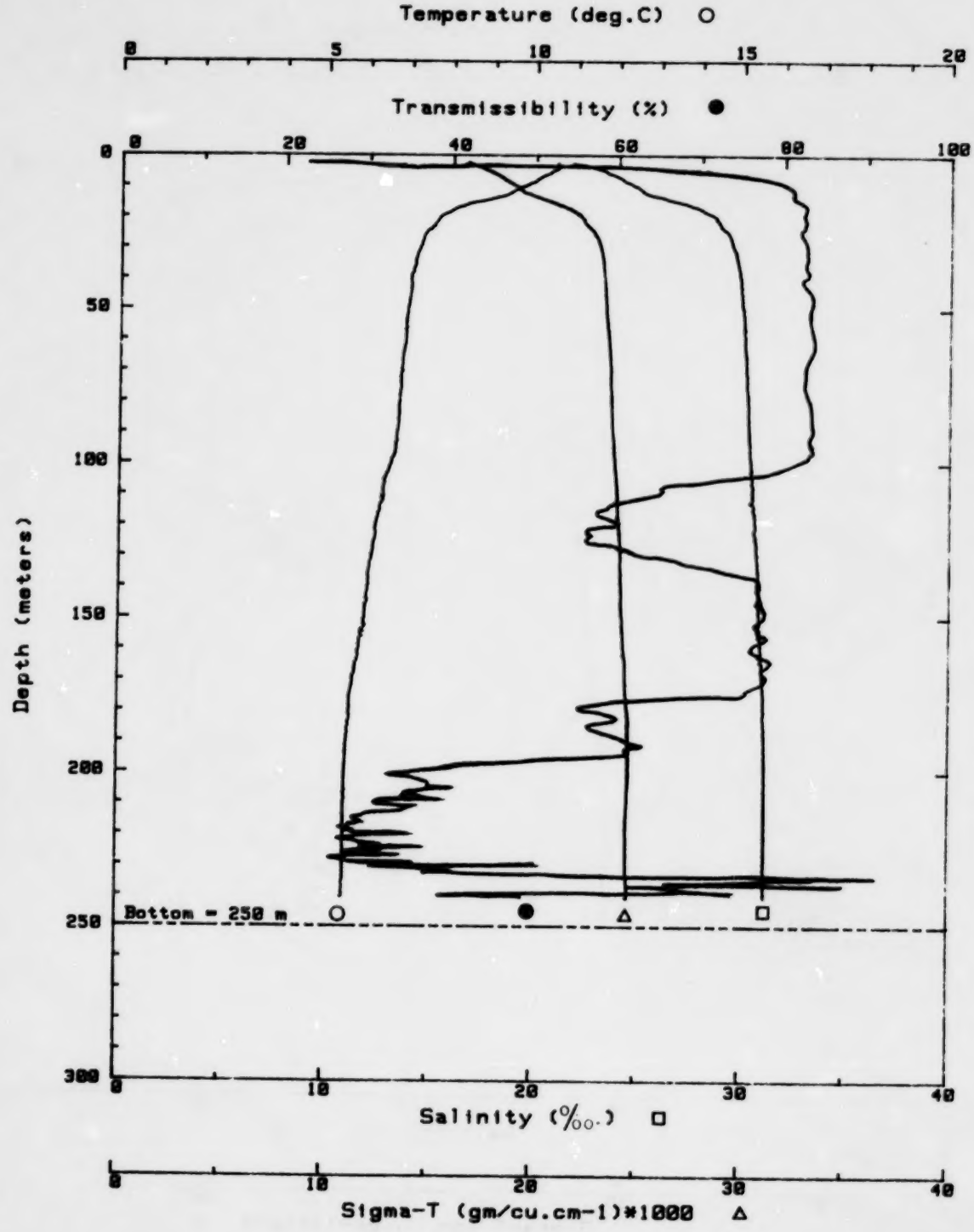
Survey Area : ALICE ARM
Station : R-16

Date : 82/09/30
Time : 1235 PST



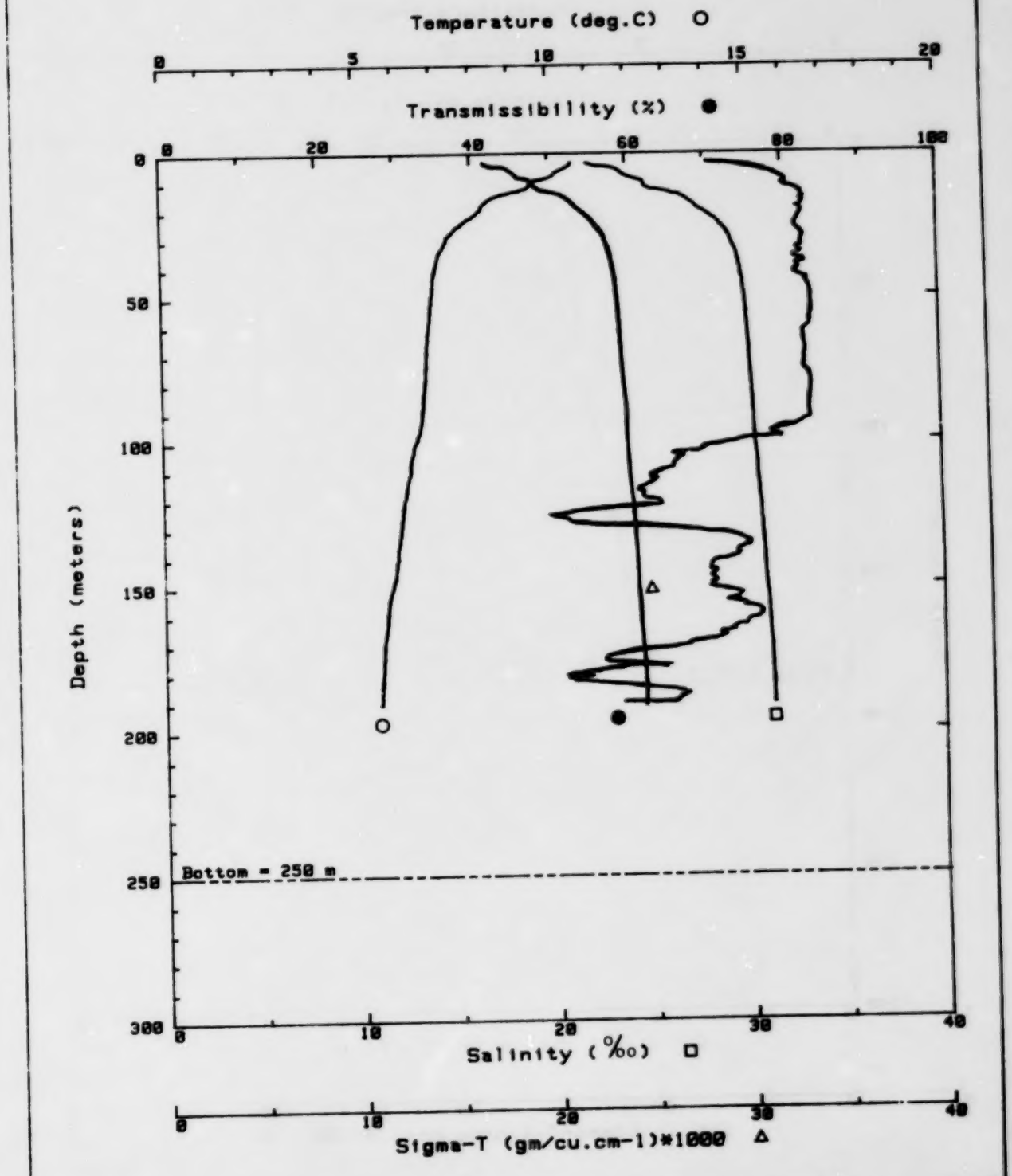
Survey Area : ALICE ARM
Station : Q-16

Date : 82/09/30
Time : 1255 PST



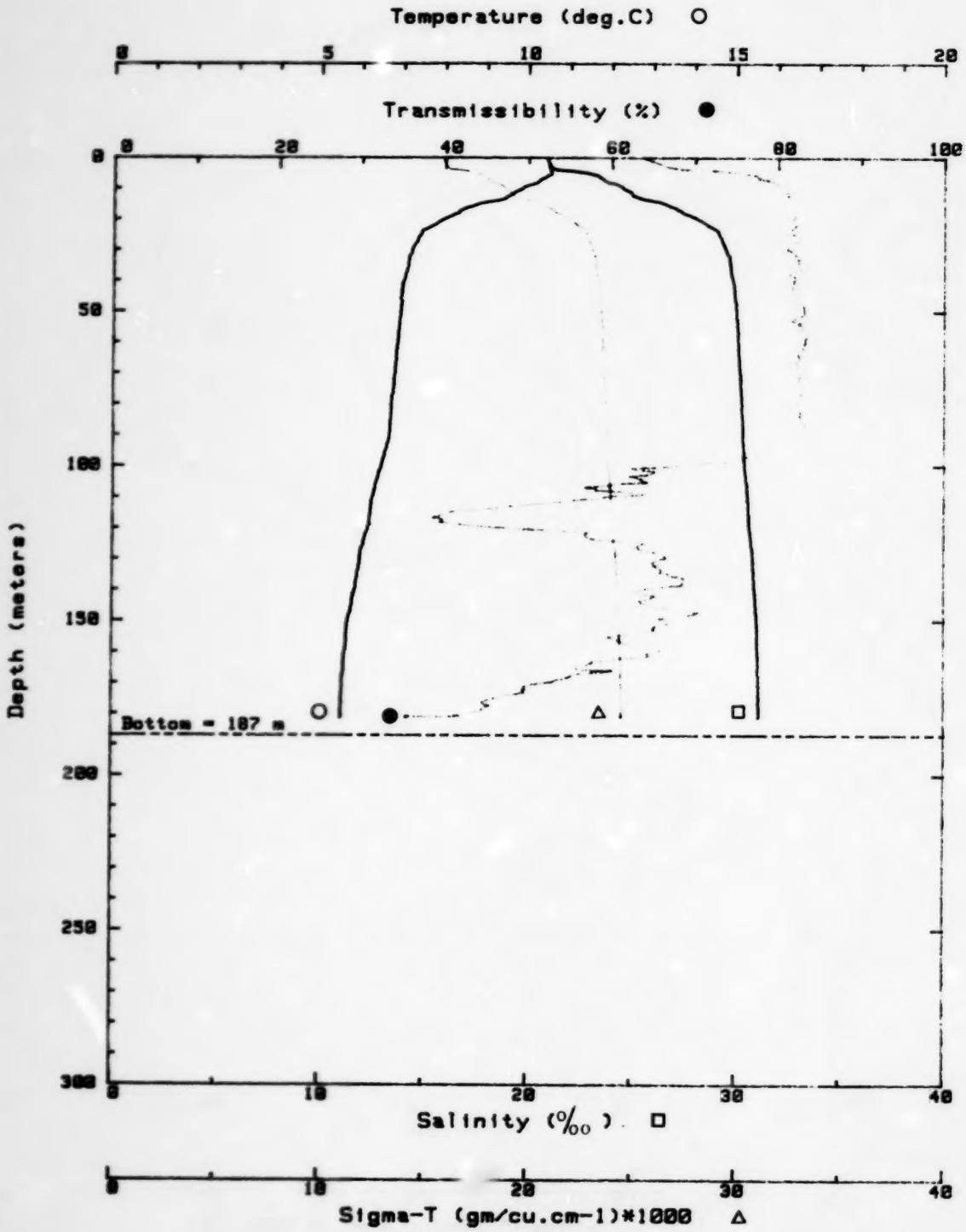
Survey Area : ALICE ARM
Station : Q-16

Date : 82/09/30
Time : 1340 PST



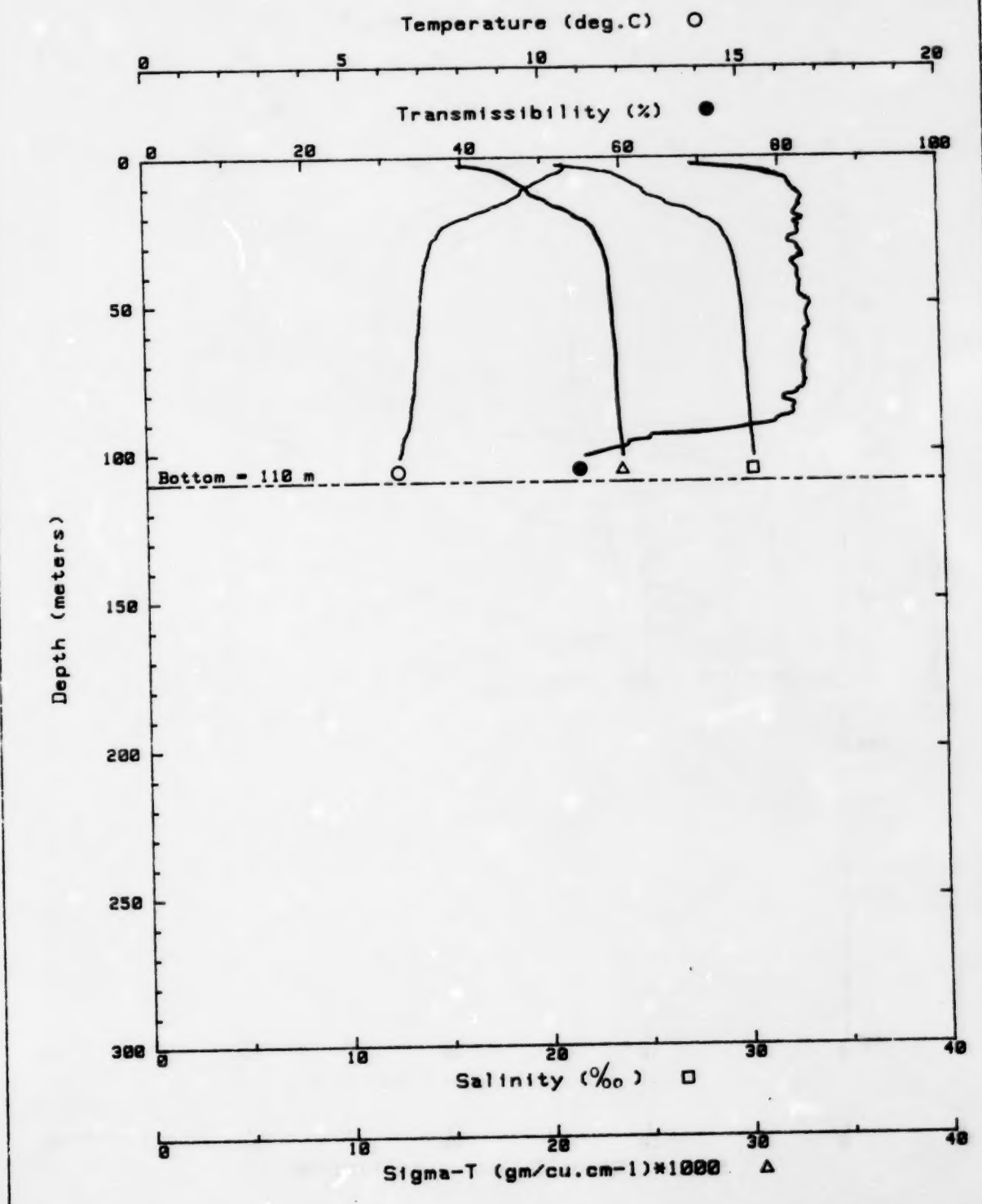
Survey Area : ALICE ARM
Station : P-16

Date : 82/09/30
Time : 1400 PST



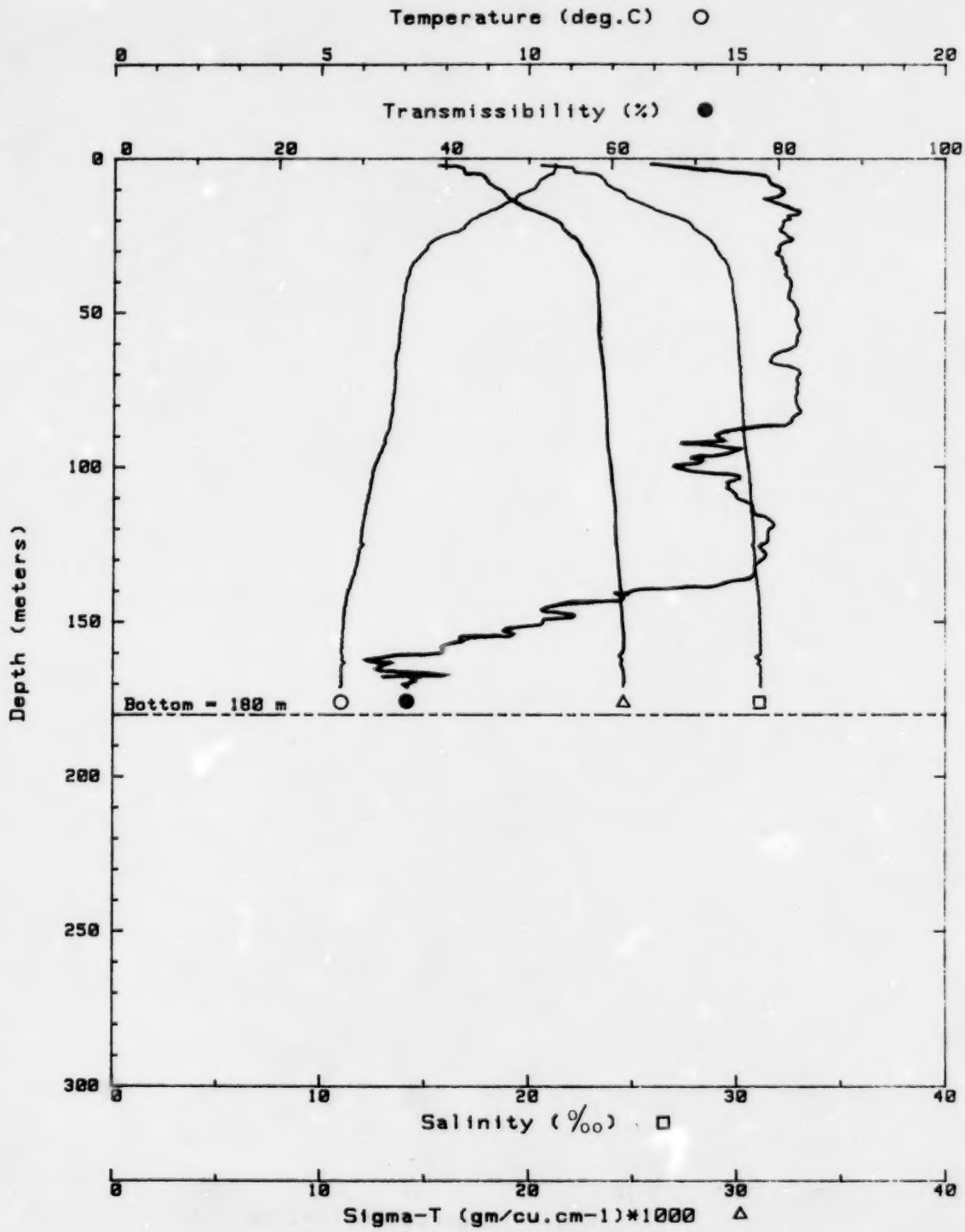
Survey Area : ALICE ARM
Station : O-16

Date : 82/09/30
Time : 1425 PST



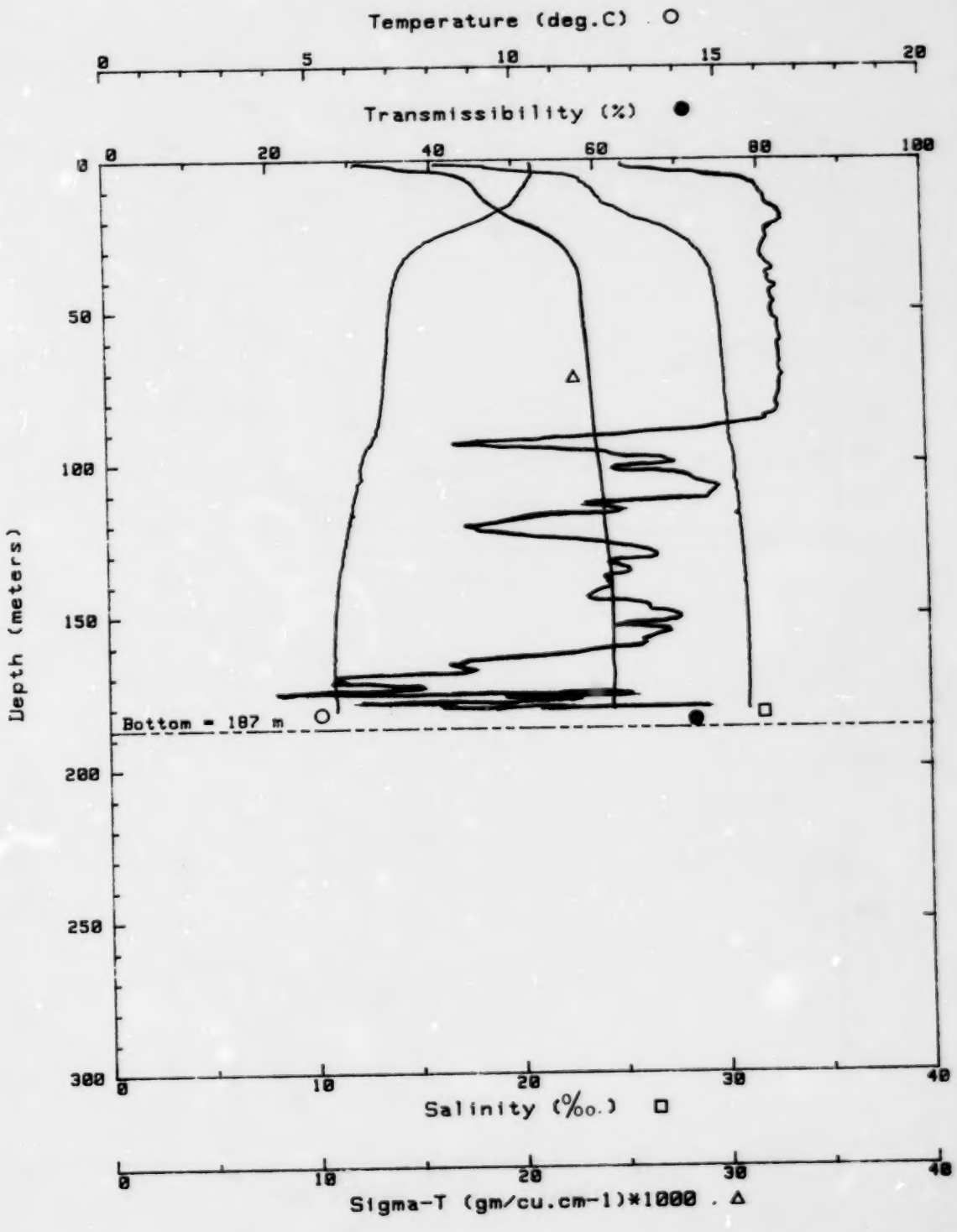
Survey Area : ALICE ARM
Station : P-12

Date : 82/09/30
Time : 1450 PST



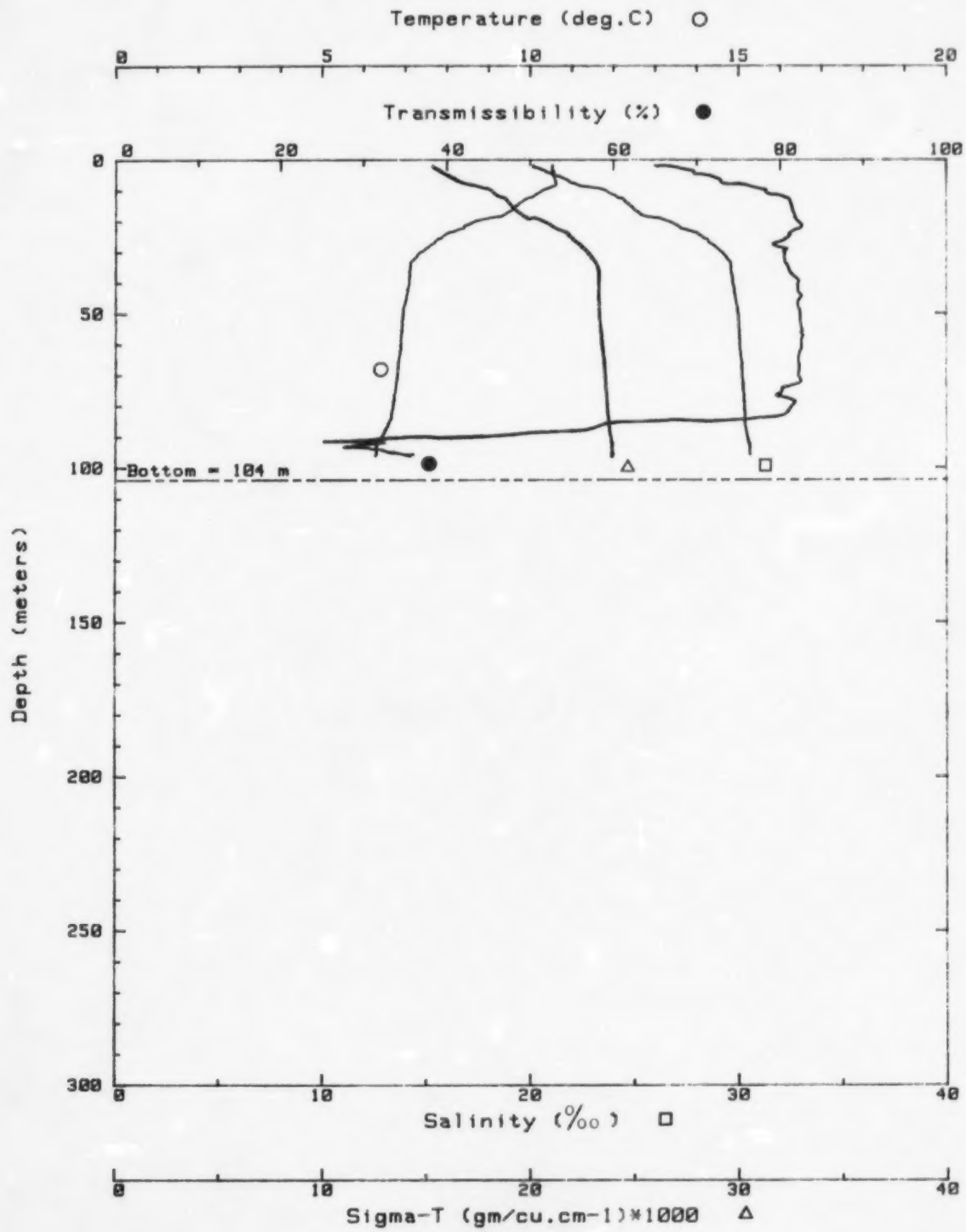
Survey Area : ALICE ARM
Station : O-13

Date : 82/09/30
Time : 1550 PST



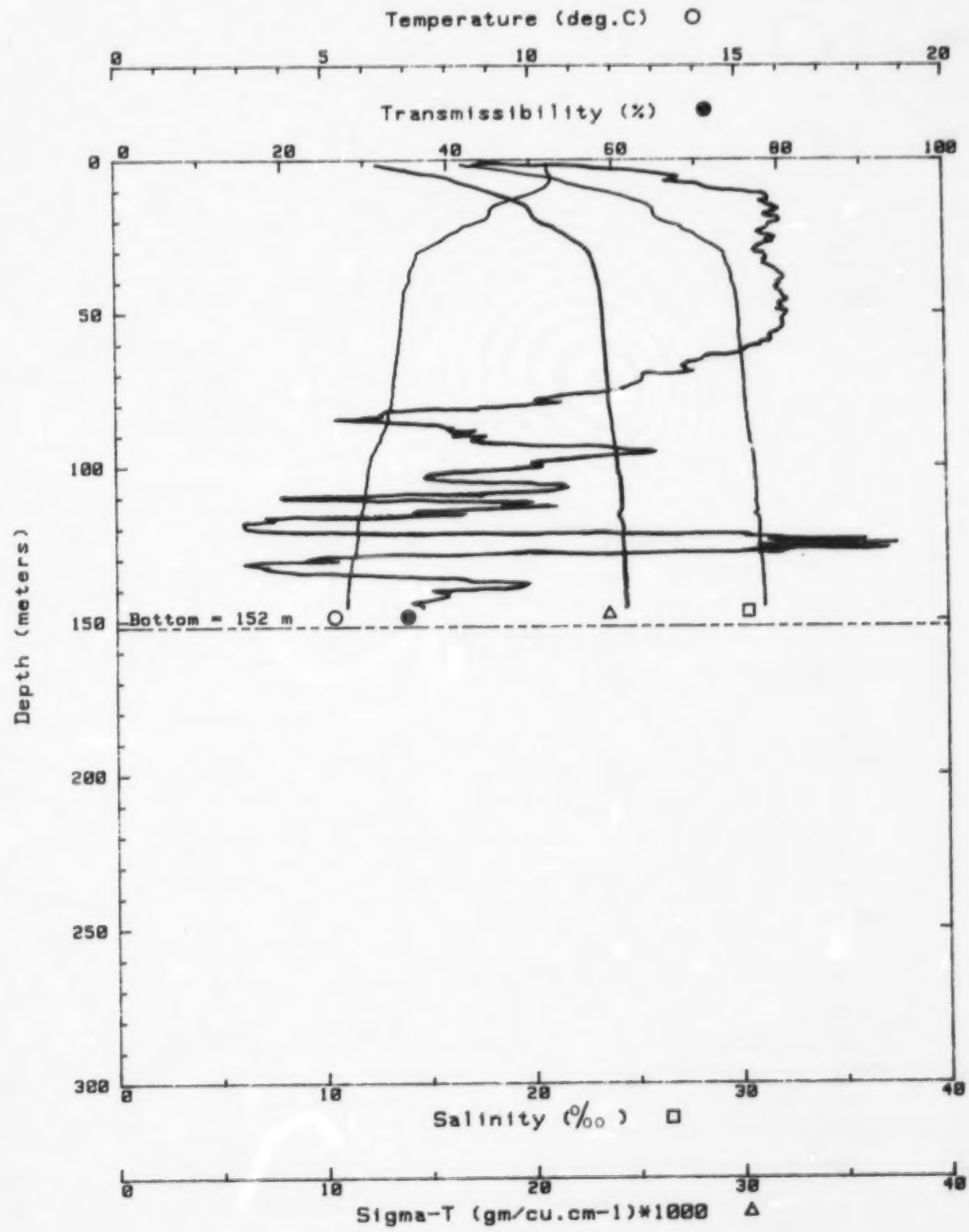
Survey Area : ALICE ARM
Station : N-14

Date : 82/09/30
Time : 1615 PST



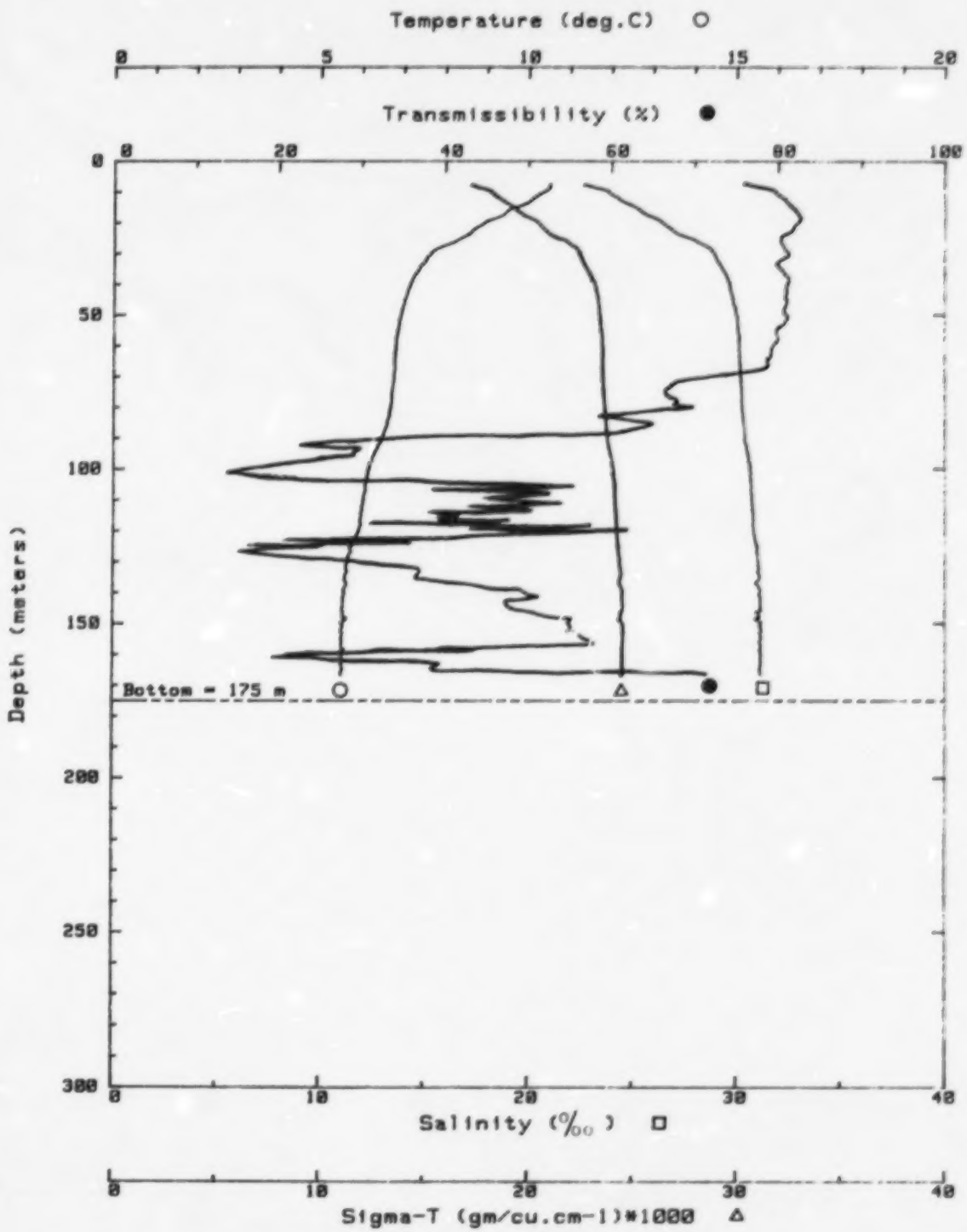
Survey Area : ALICE ARM
Station : N-10

Date : 82/03/30
Time : 1645 PST


Temperature (deg.C) ○
0 5 10 15 20
Transmissibility (%) ●
0 20 40 60 80 100
Depth (meters)
0 50 100 150 200 250 300
Bottom = 152 m
Salinity (‰) □
0 10 20 30 40
Sigma-T (gm/cu.cm-1)*1000 △
0 10 20 30 40

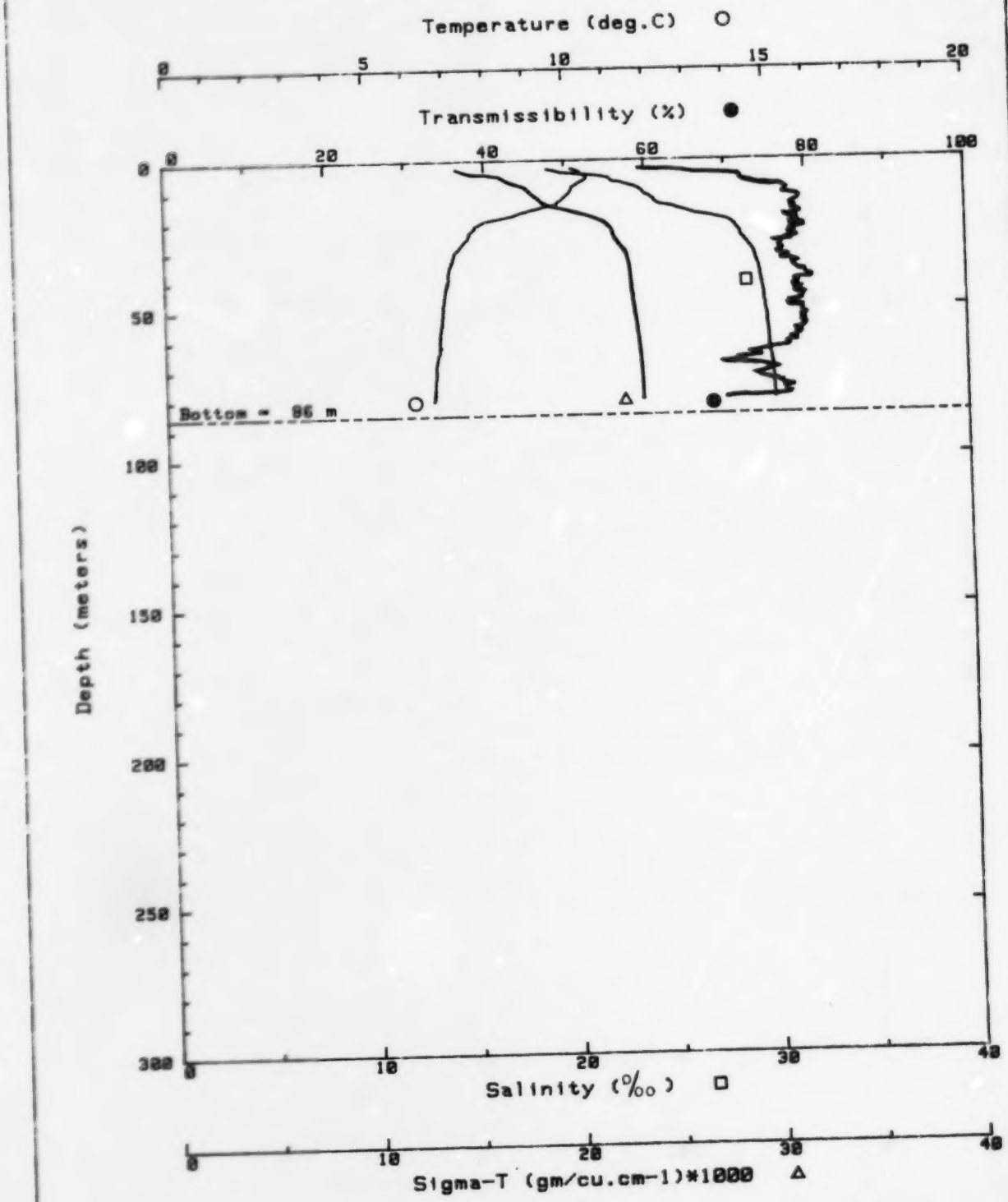
Survey Area : ALICE ARM
Station : M-11

Date : 82/09/30
Time : 1710 PST


Temperature (deg.C) ○
0 5 10 15 20
Transmissibility (%) ●
0 20 40 60 80 100
Depth (meters)
0 50 100 150 200 250 300
Bottom = 175 m
○ △ ● □
0 10 20 30 40
Salinity (‰) □
0 10 20 30 40
Sigma-T (gm/cu.cm-1)*1000 △

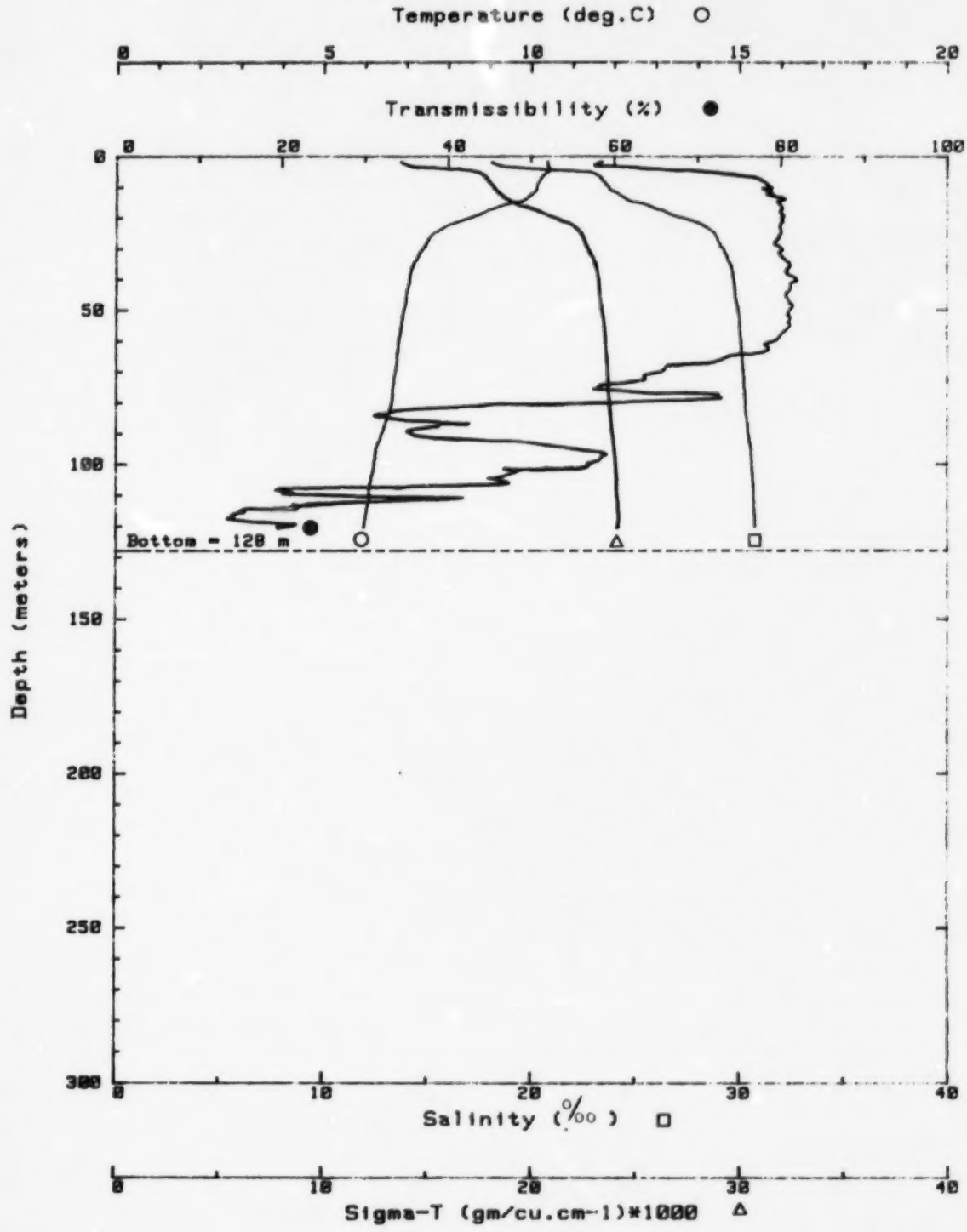
Survey Area : ALICE ARM
Station : N-7

Date : 82/09/30
Time : 1755 PST



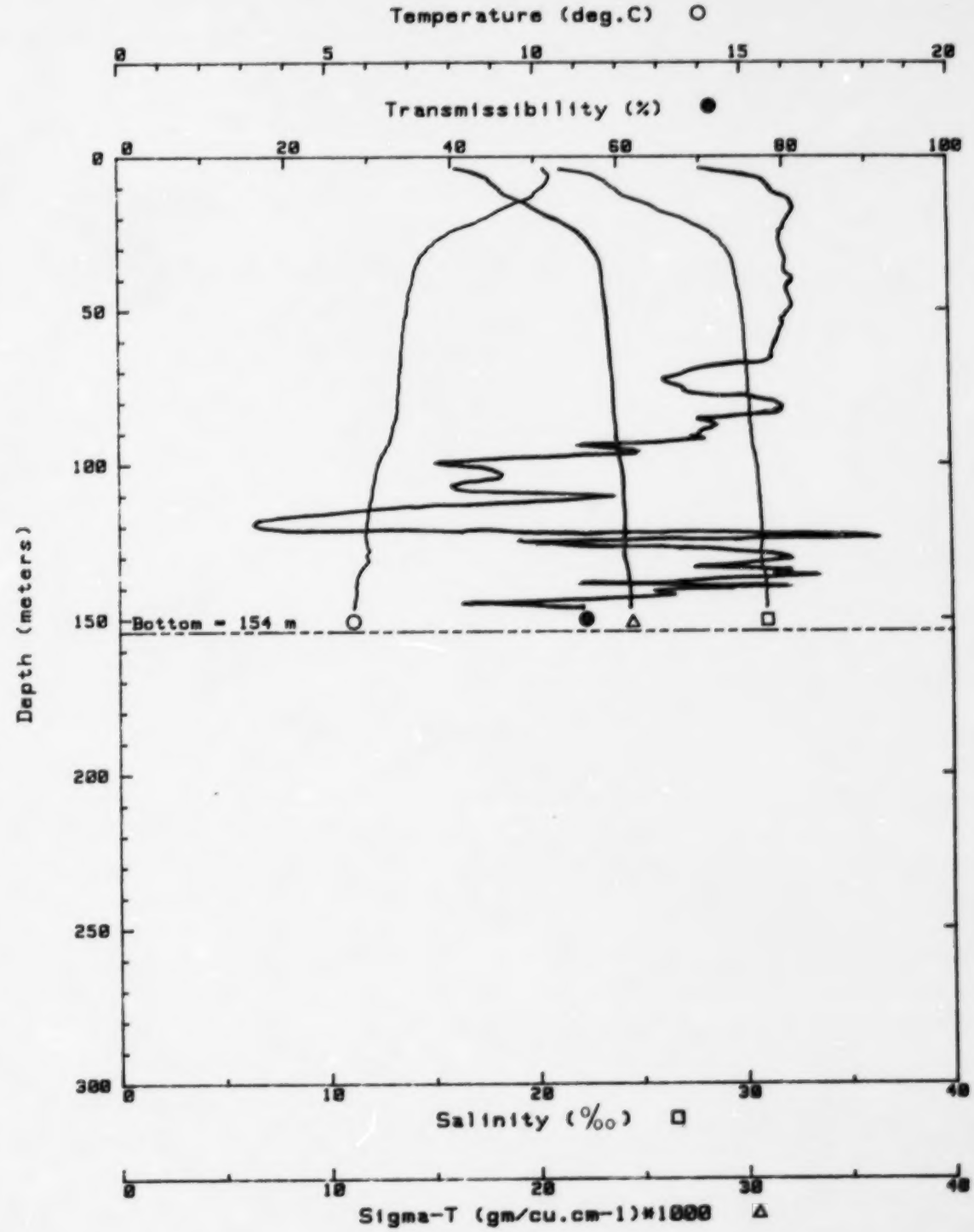
Survey Area : ALICE ARM
Station : M-8

Date : 82/09/30
Time : 1810 PST


Temperature (deg.C) ○
0 5 10 15 20
Transmissibility (%) ●
0 20 40 60 80 100
Bottom = 120 m
Depth (meters)
0 50 100 150 200 250 300
Salinity (‰) □
0 10 20 30 40
Sigma-T (gm/cu.cm-1)*1000 △
0 10 20 30 40

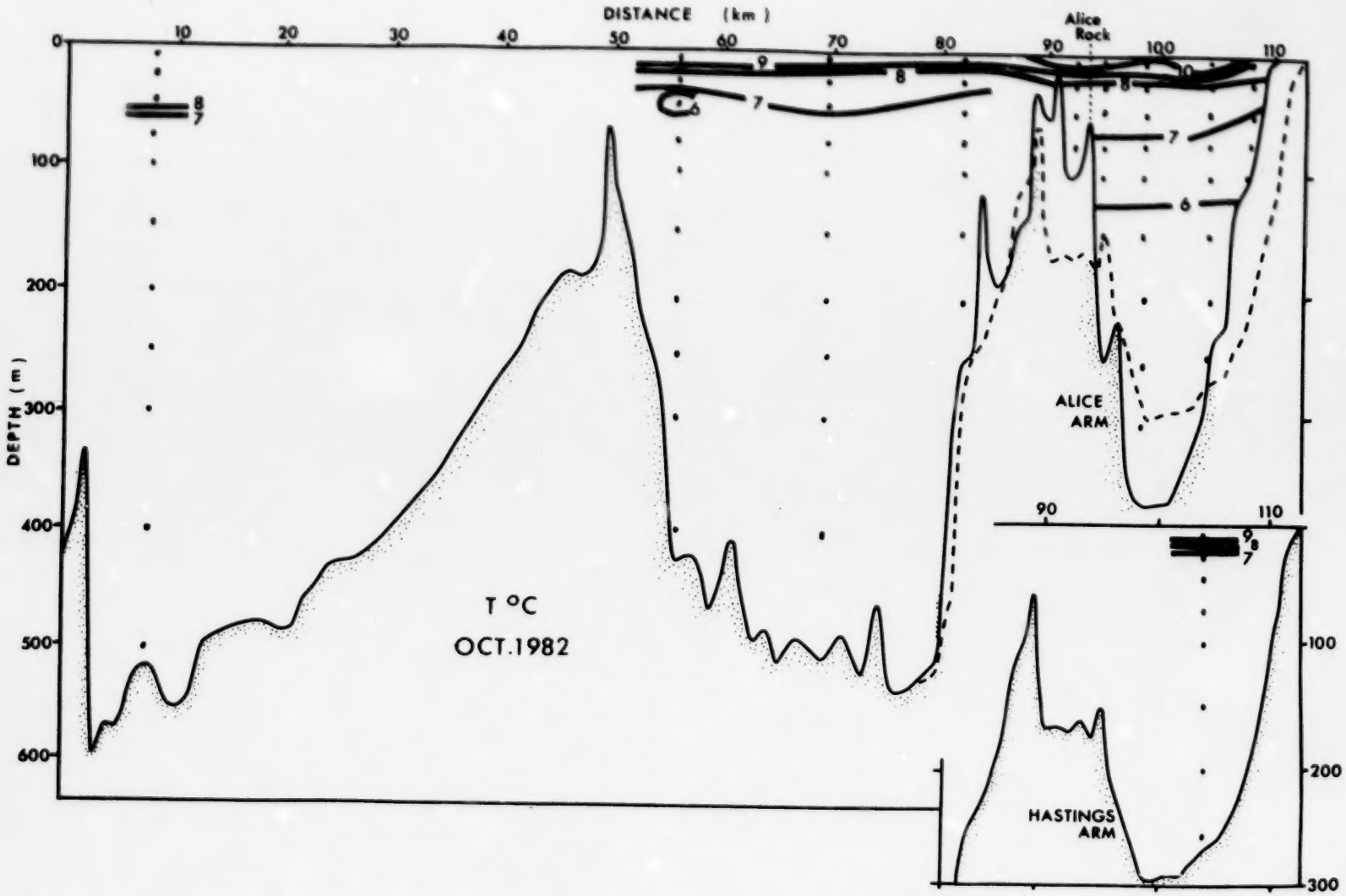
Survey Area : ALICE ARM
Station : L-9

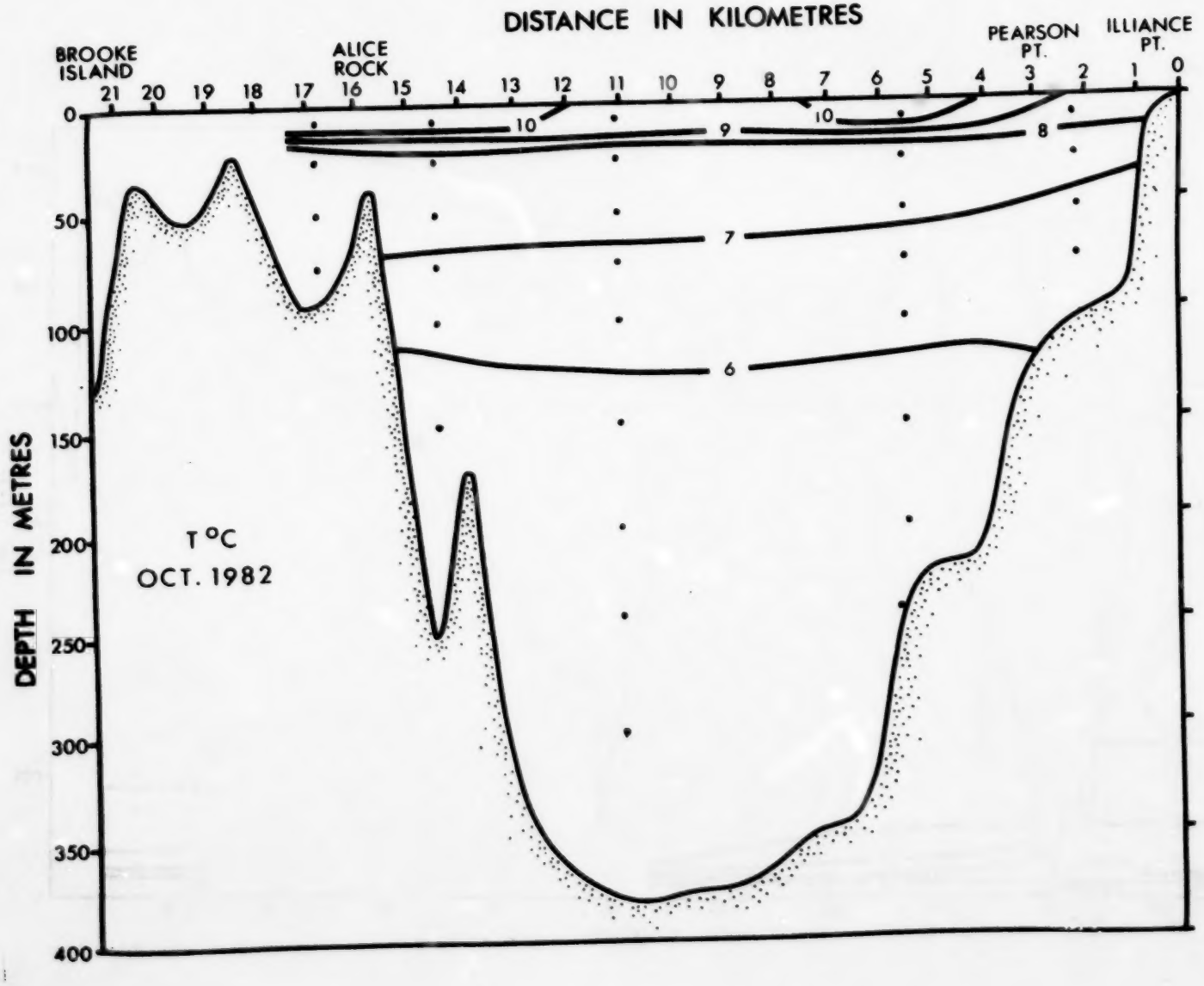
Date : 82/09/30
Time : 1820 PST

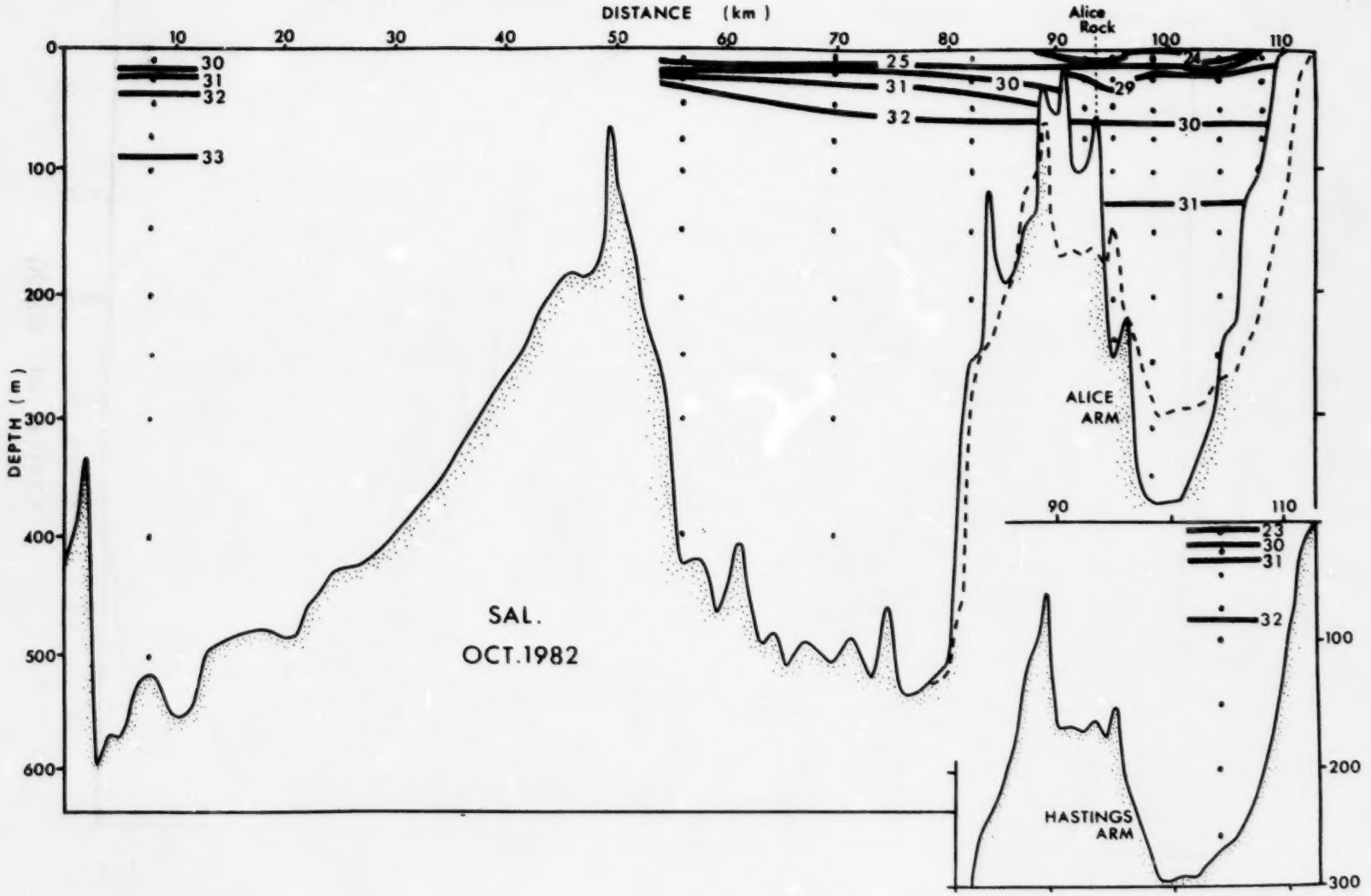


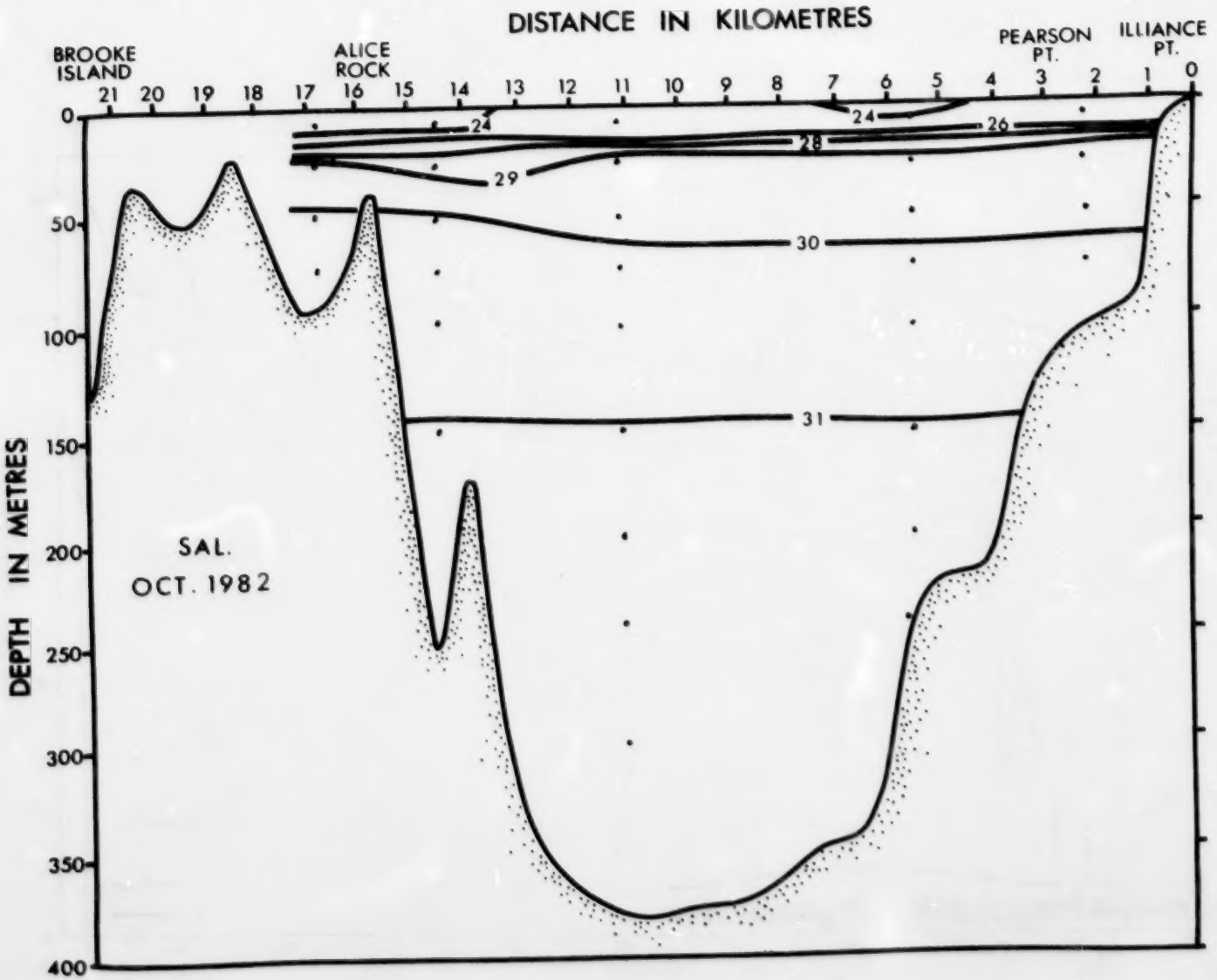
Appendix 2.

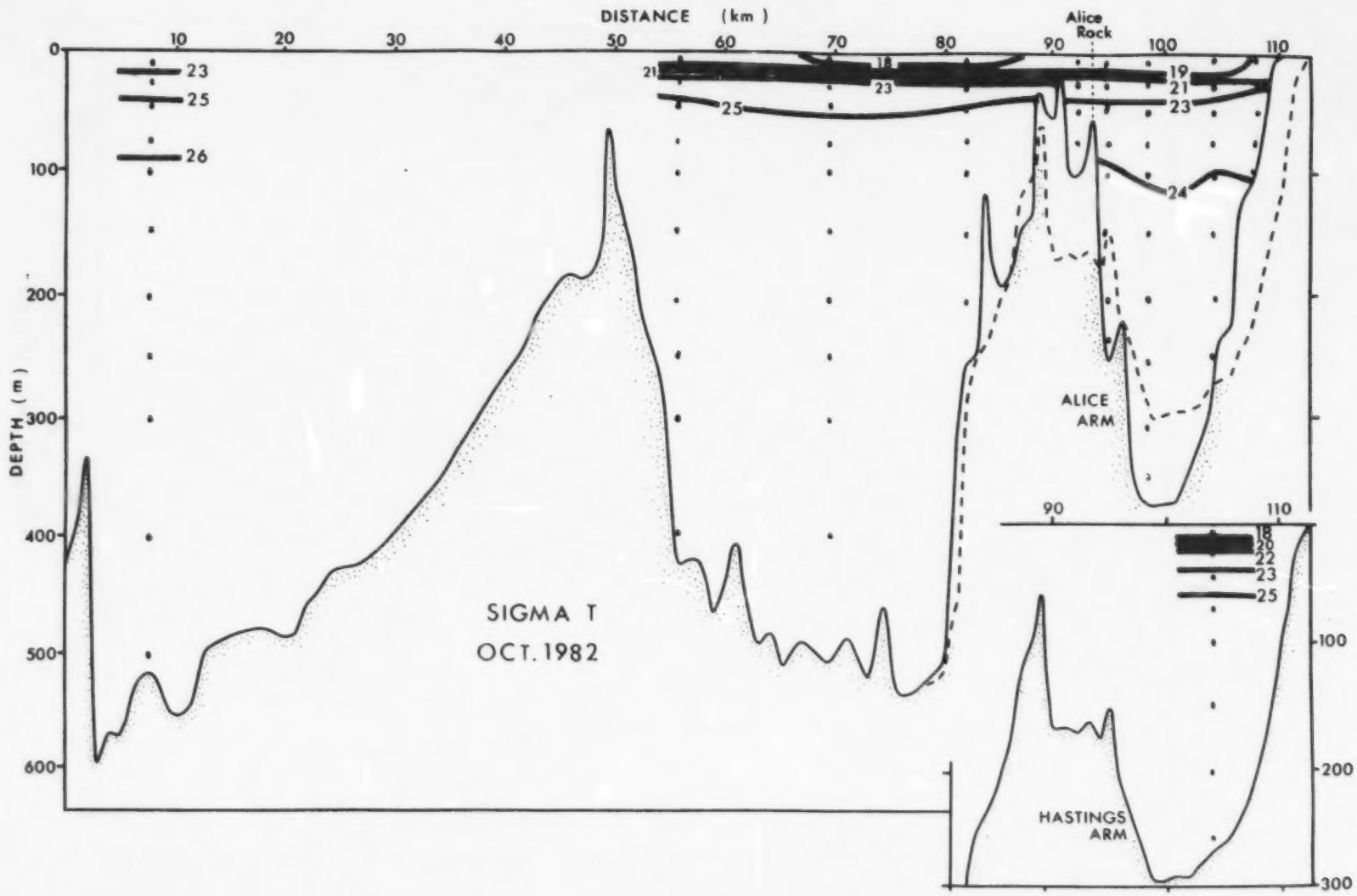
Longitudinal sections

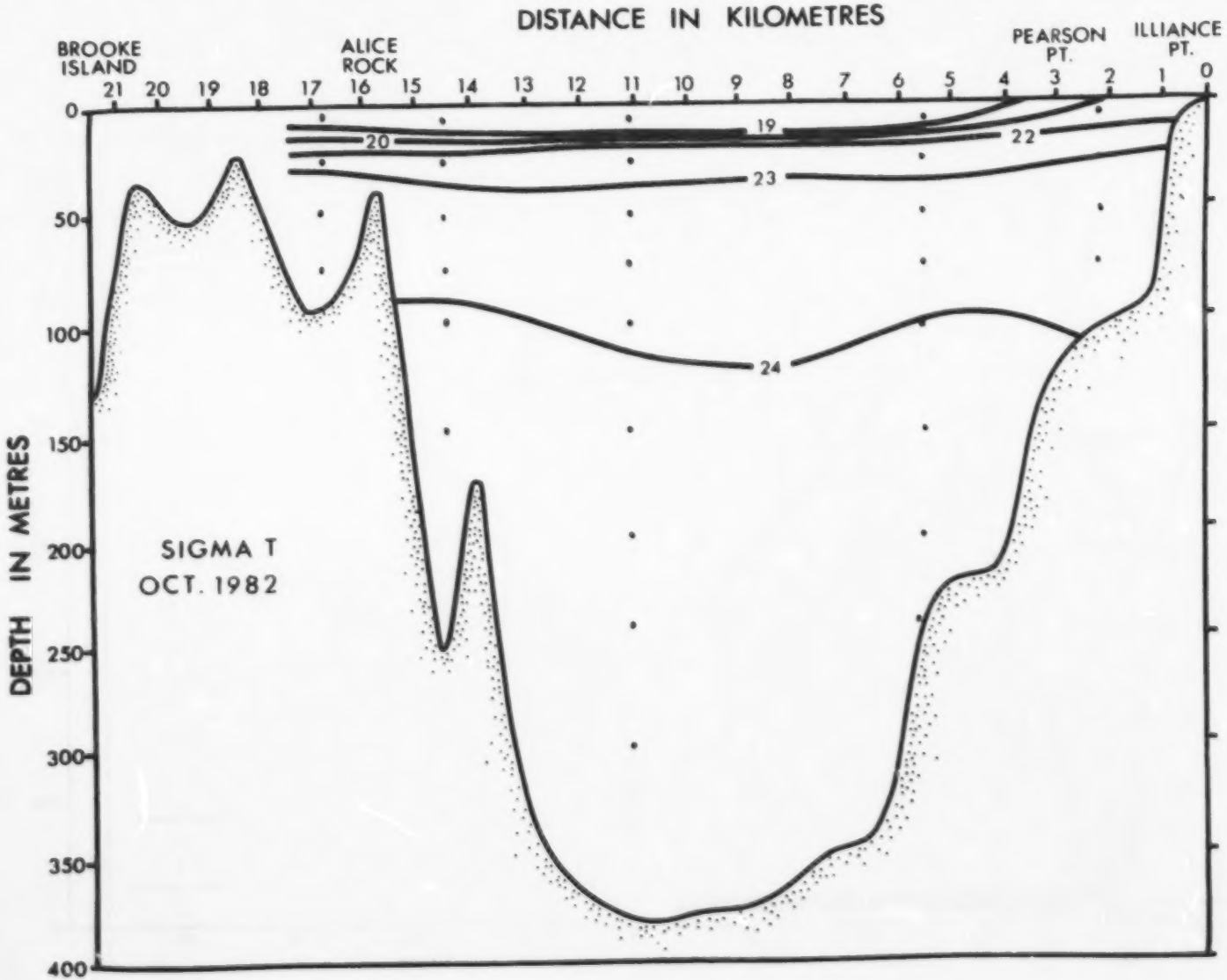

DISTANCE (km)
0
10
20
30
40
50
60
70
80
90
100
110
Alice Rock
DEPTH (m)
100
200
300
400
500
600
T °C
OCT.1982
ALICE ARM
HASTINGS ARM

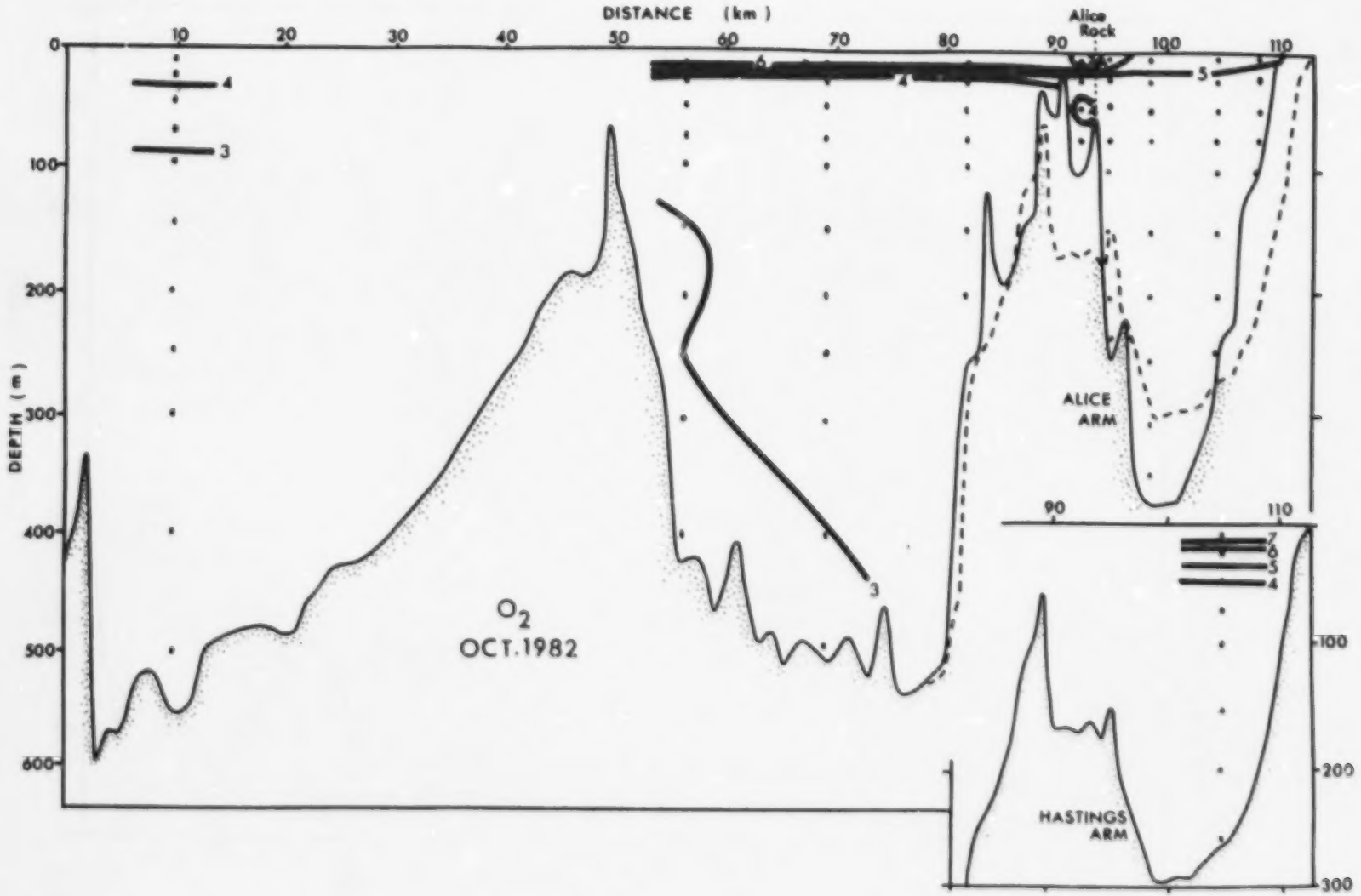

DISTANCE IN KILOMETRES
BROOKE ISLAND
ALICE ROCK
PEARSON PT.
ILLIANCE PT.
21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
0
50
100
150
200
250
300
350
400
DEPTH IN METRES
10
9
10
8
7
6
T °C
OCT. 1982

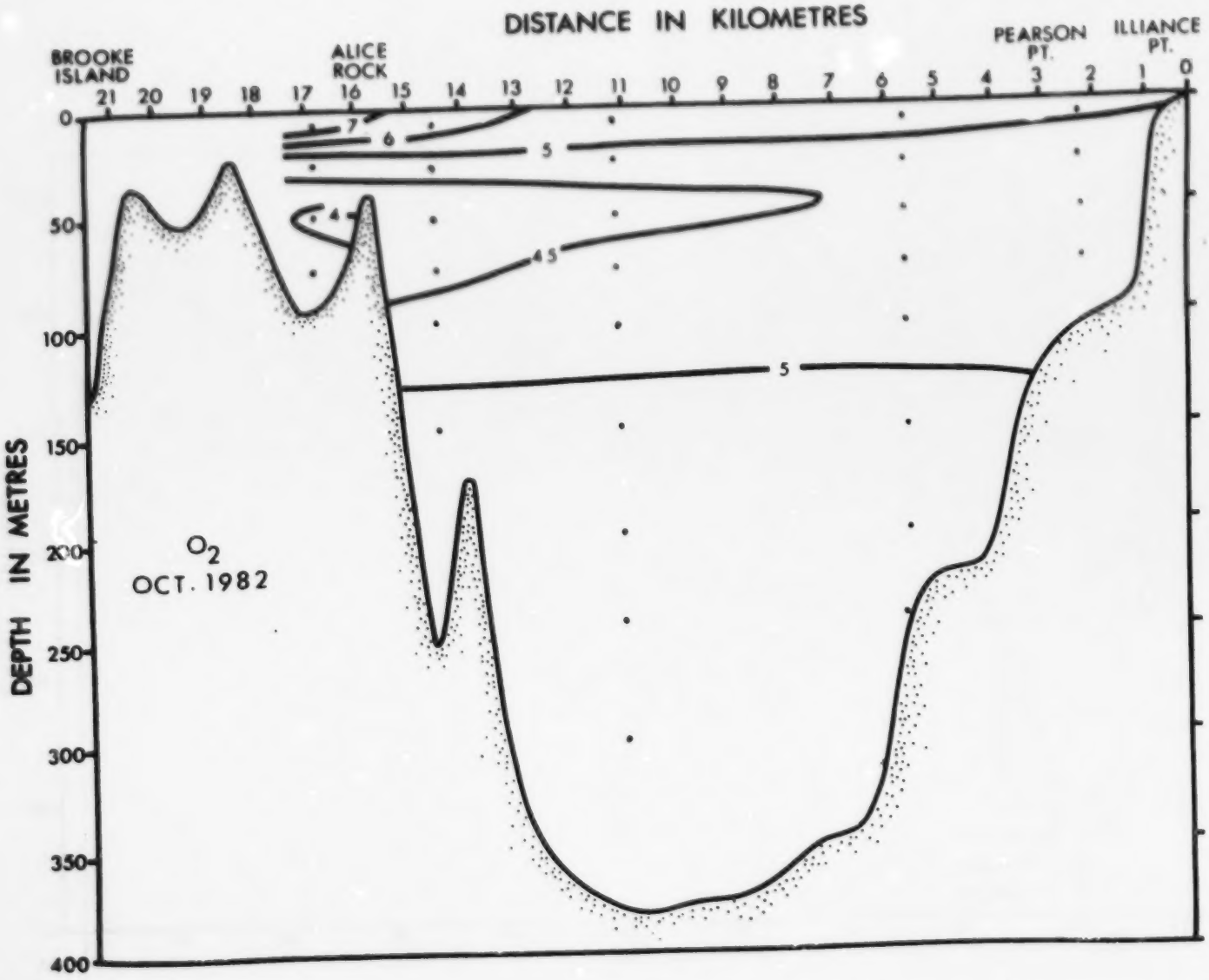

DISTANCE (km)
Alice Rock
DEPTH (m)
SAL.
OCT.1982
ALICE ARM
HASTINGS ARM

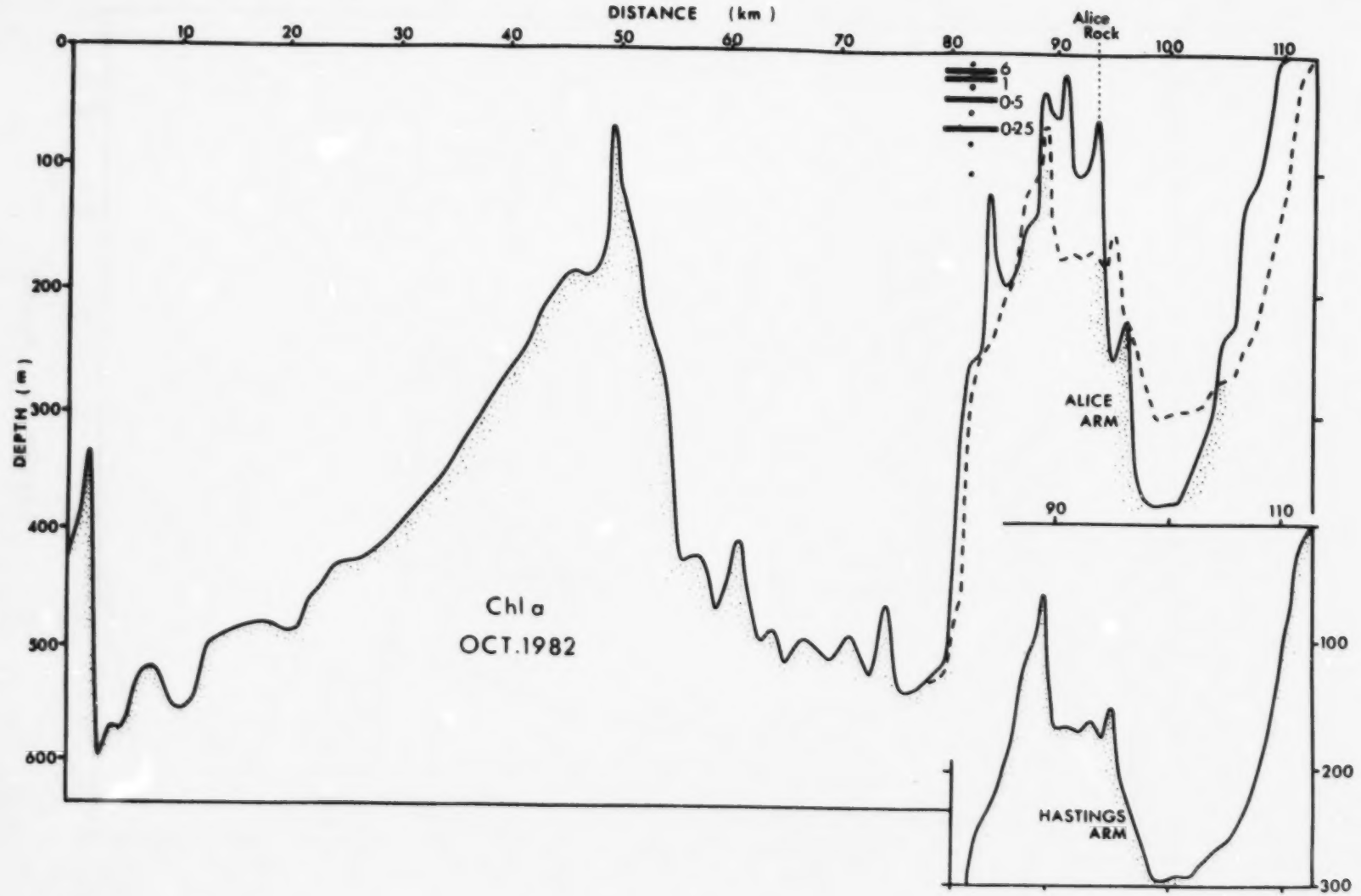

DISTANCE IN KILOMETRES
BROOKE ISLAND
ALICE ROCK
PEARSON PT.
ILLIANCE PT.
21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
24
24
26
28
29
30
31
DEPTH IN METRES
0
50
100
150
200
250
300
350
400
SAL.
OCT. 1982

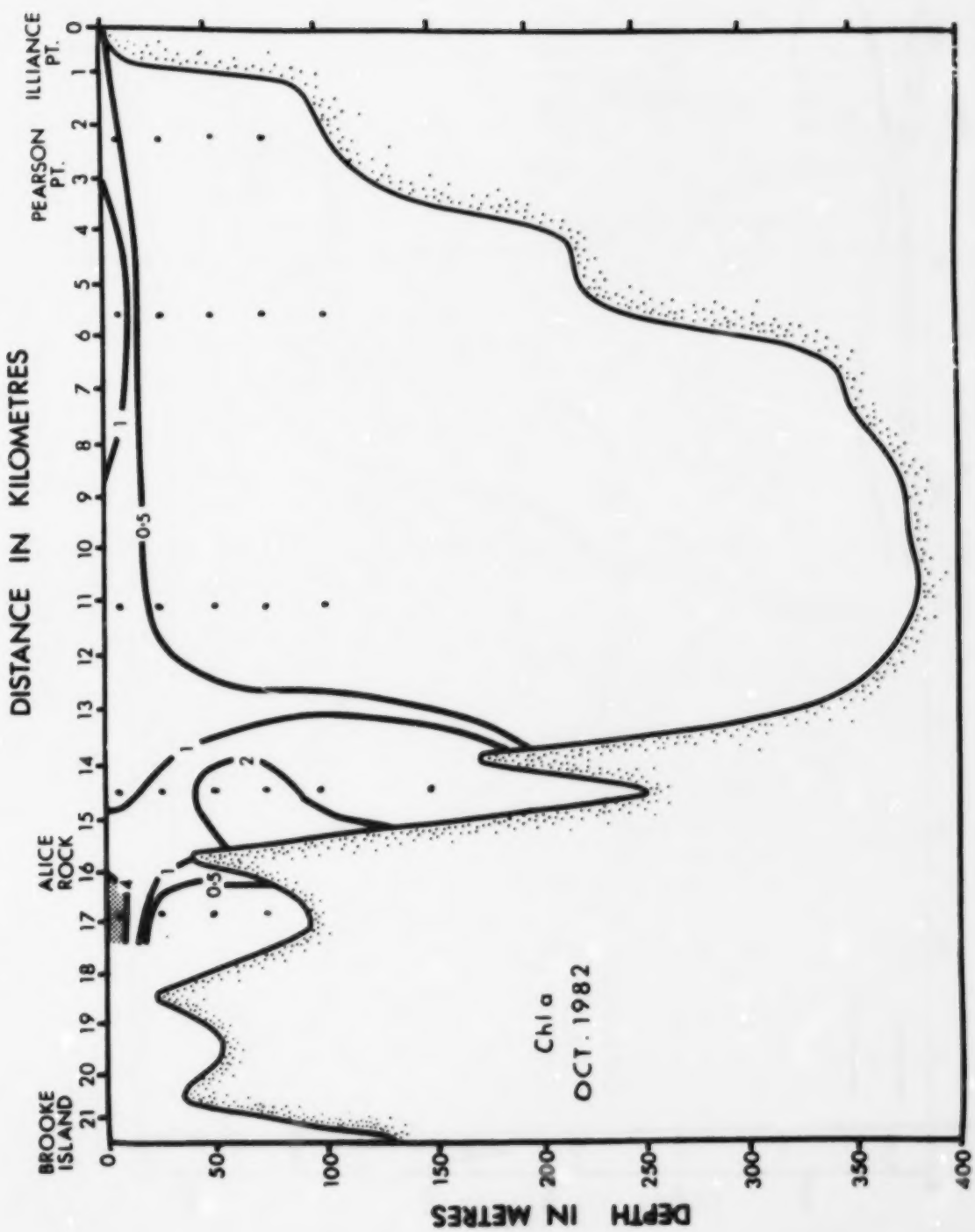

DISTANCE (km)
Alice Rock
DEPTH (m)
SIGMA T
OCT. 1982
ALICE ARM
HASTINGS ARM

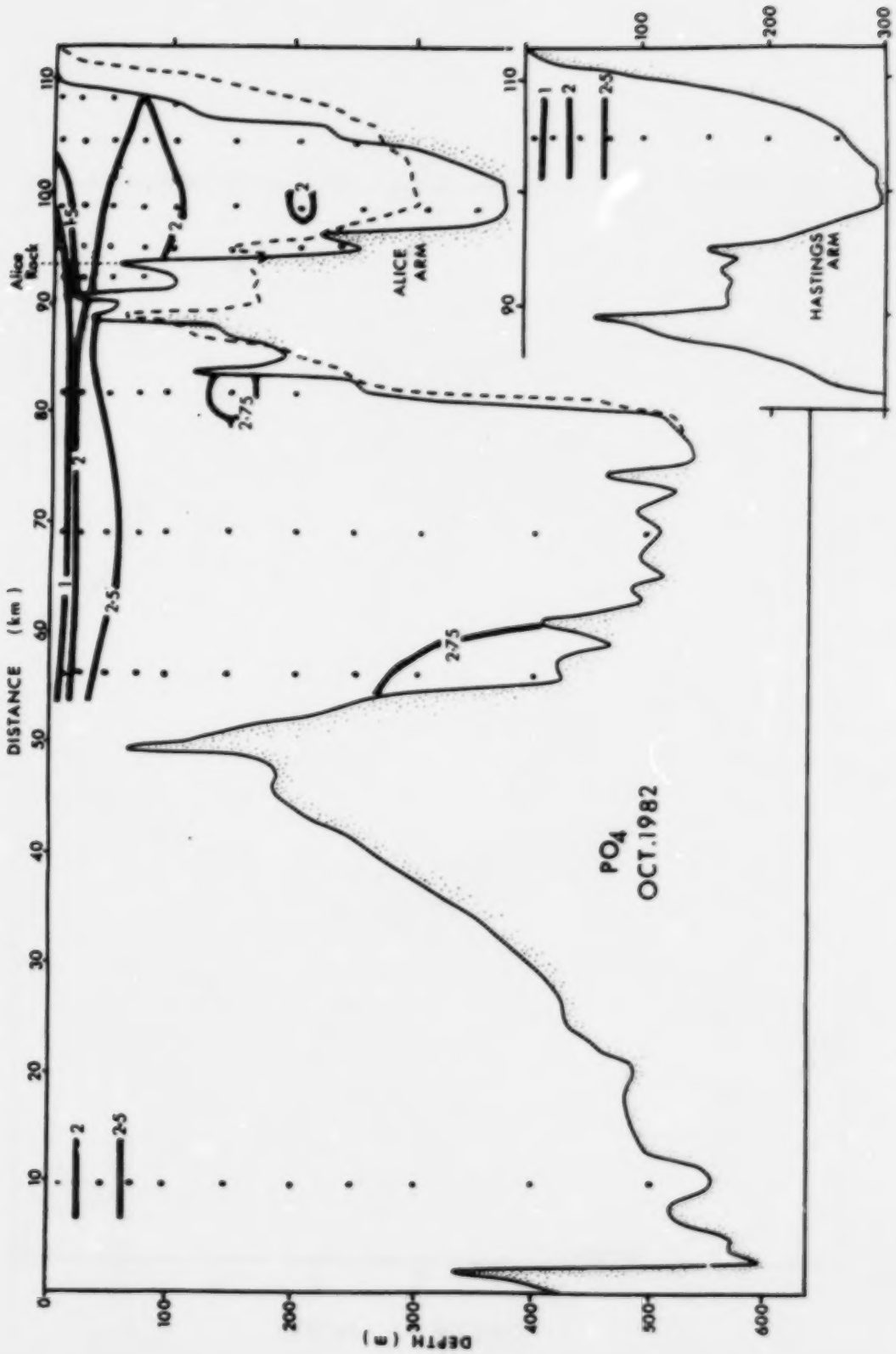

DISTANCE IN KILOMETRES
BROOKE ISLAND
ALICE ROCK
PEARSON PT.
ILLIANCE PT.
21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
0
50
100
150
200
250
300
350
400
DEPTH IN METRES
19
20
22
23
24
SIGMA T
OCT. 1982

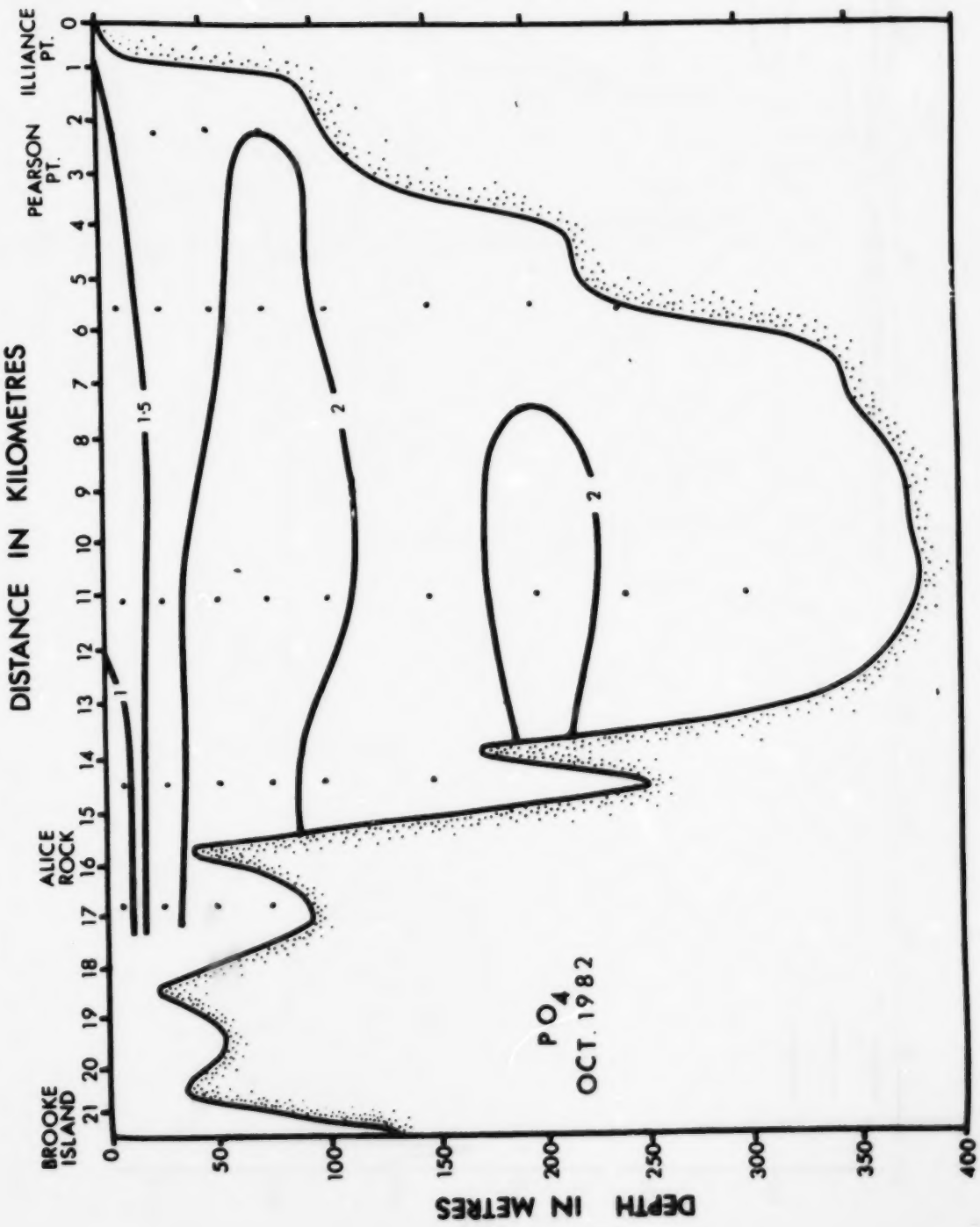

DISTANCE (km)
Alice Rock
DEPTH (m)
ALICE ARM
HASTINGS ARM
O2
OCT.1982

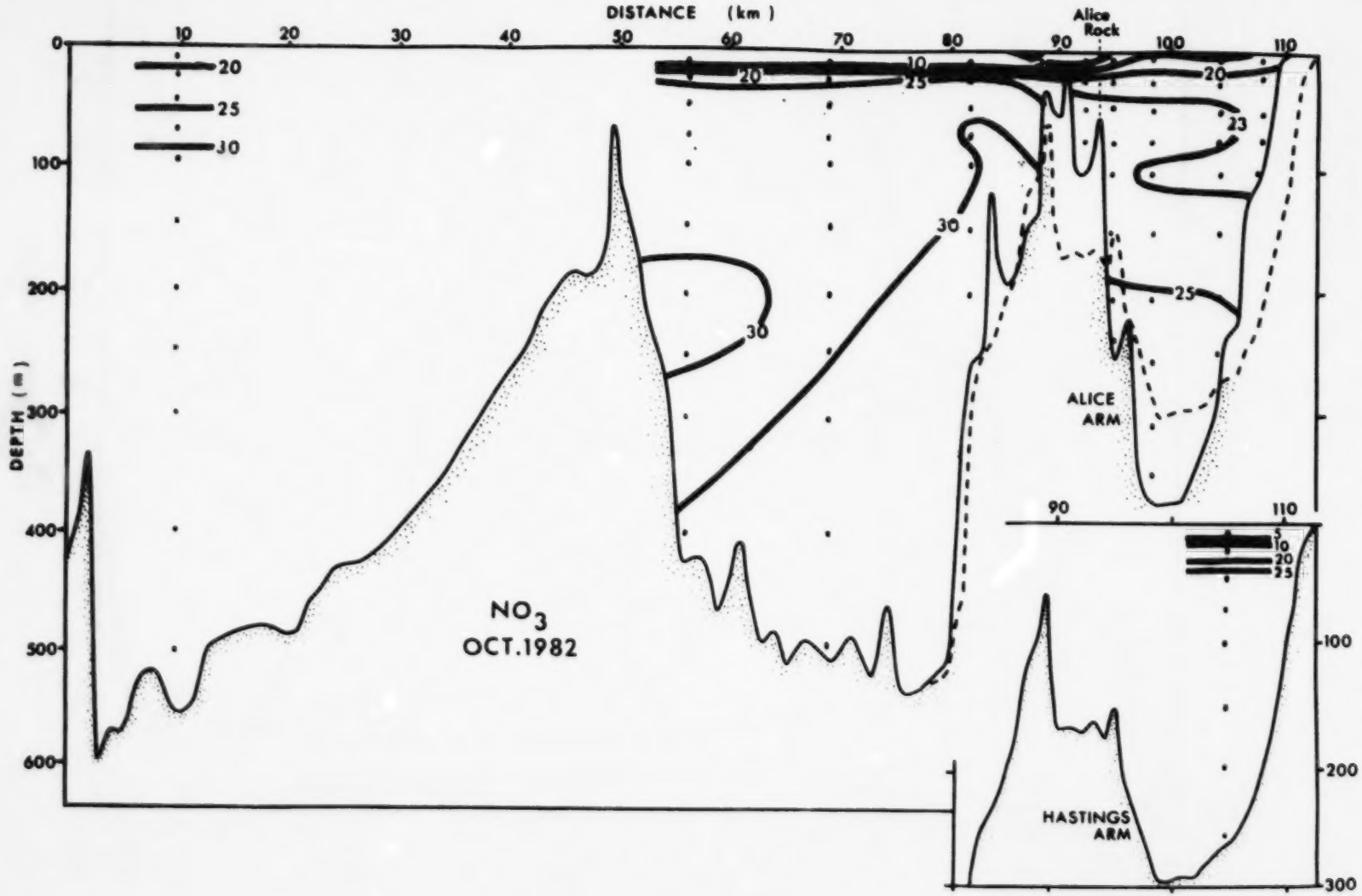

DISTANCE IN KILOMETRES
BROOKE ISLAND
ALICE ROCK
PEARSON PT.
ILLIANCE PT.
21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
DEPTH IN METRES
0 50 100 150 200 250 300 350 400
7
6
5
4
4.5
5
O_2
OCT. 1982

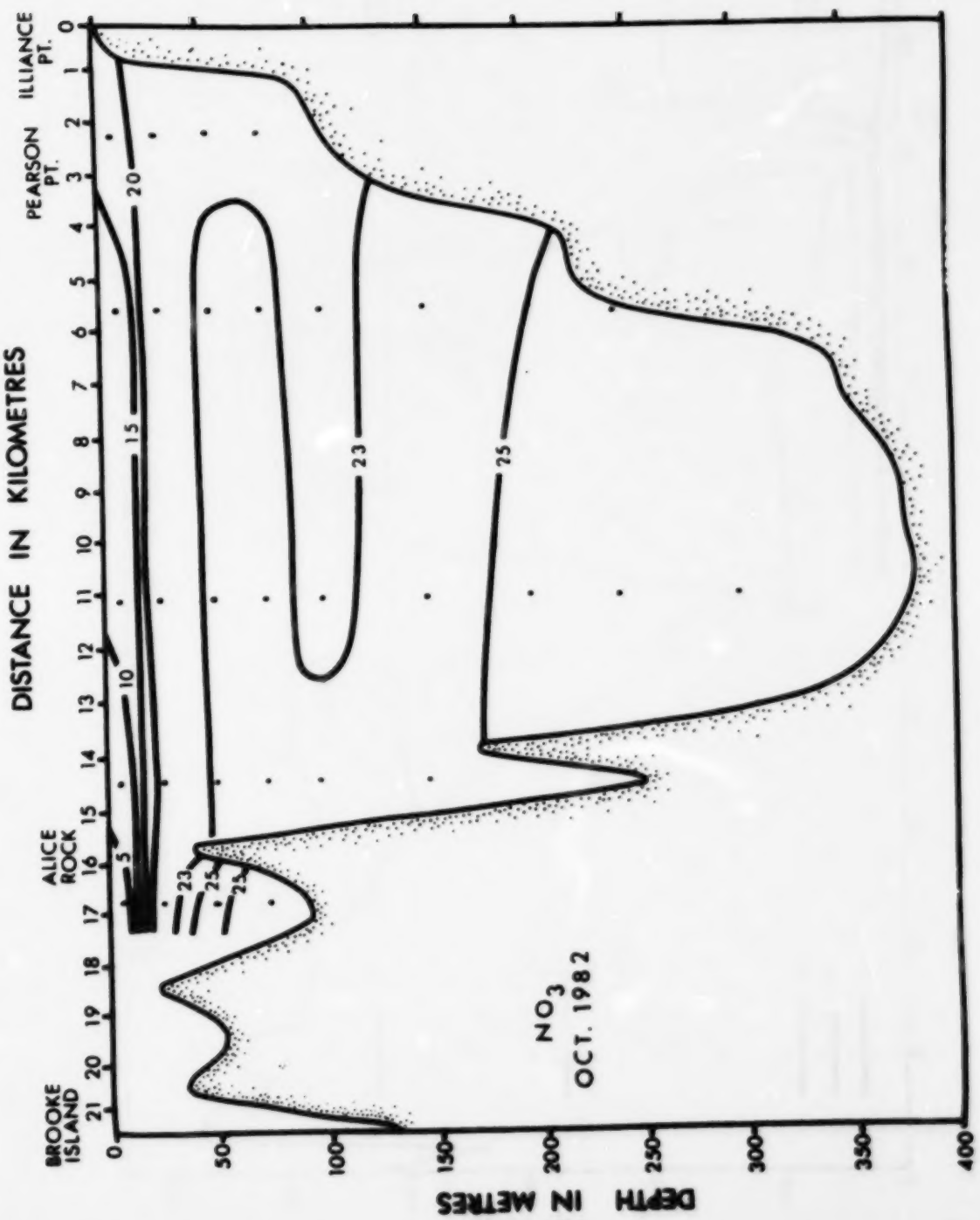

DISTANCE (km)
0
10
20
30
40
50
60
70
80
90
100
110
Alice Rock
6
1
0·5
0·25
DEPTH (m)
100
200
300
400
500
600
Chl a
OCT.1982
ALICE ARM
90
110
100
HASTINGS ARM
200
300

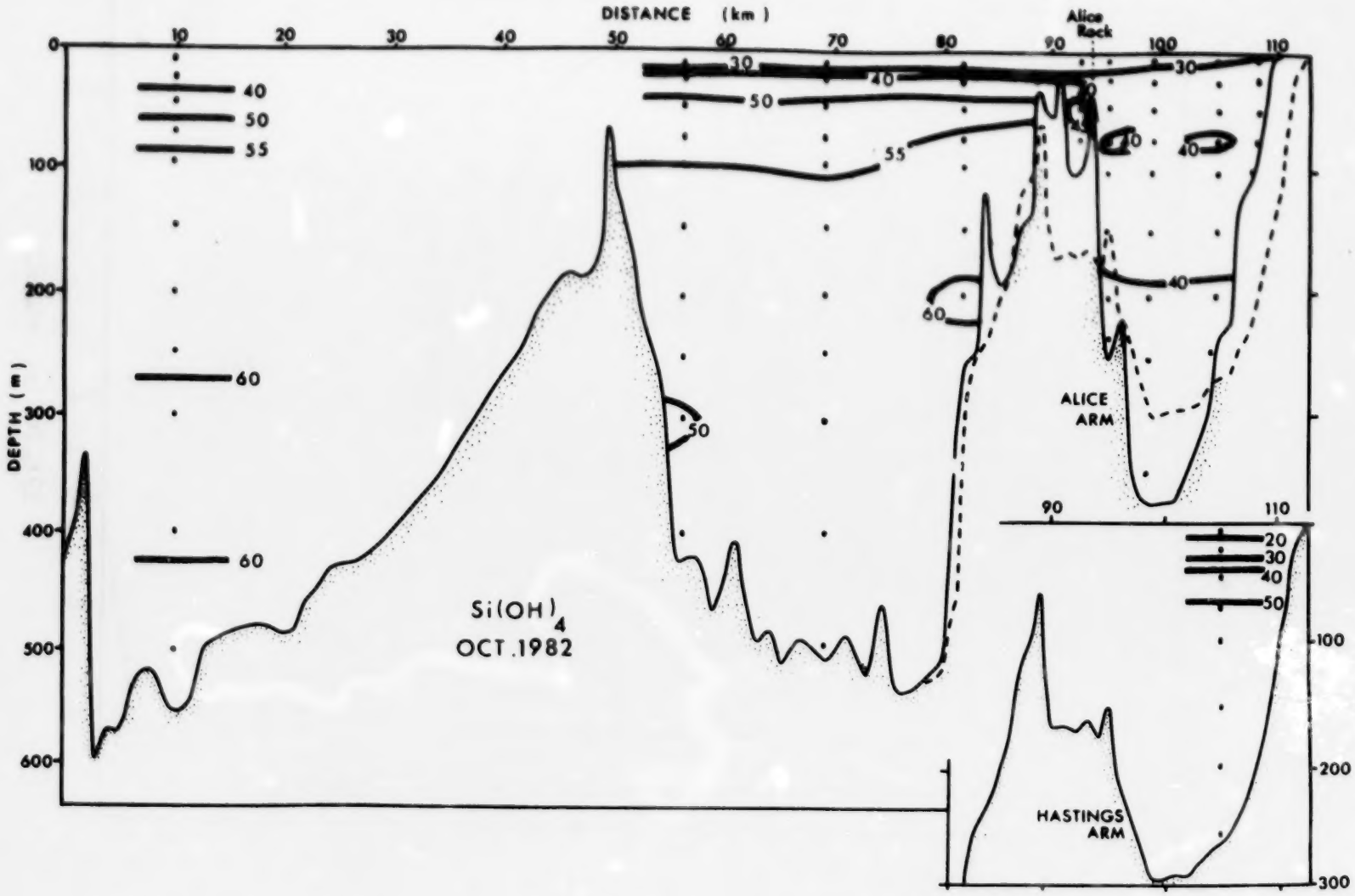

DISTANCE IN KILOMETRES
DEPTH IN METRES
BROOKE ISLAND
ALICE ROCK
PEARSON PT.
ILLIANCE PT.
Chl a
OCT. 1982
0·5
1
2

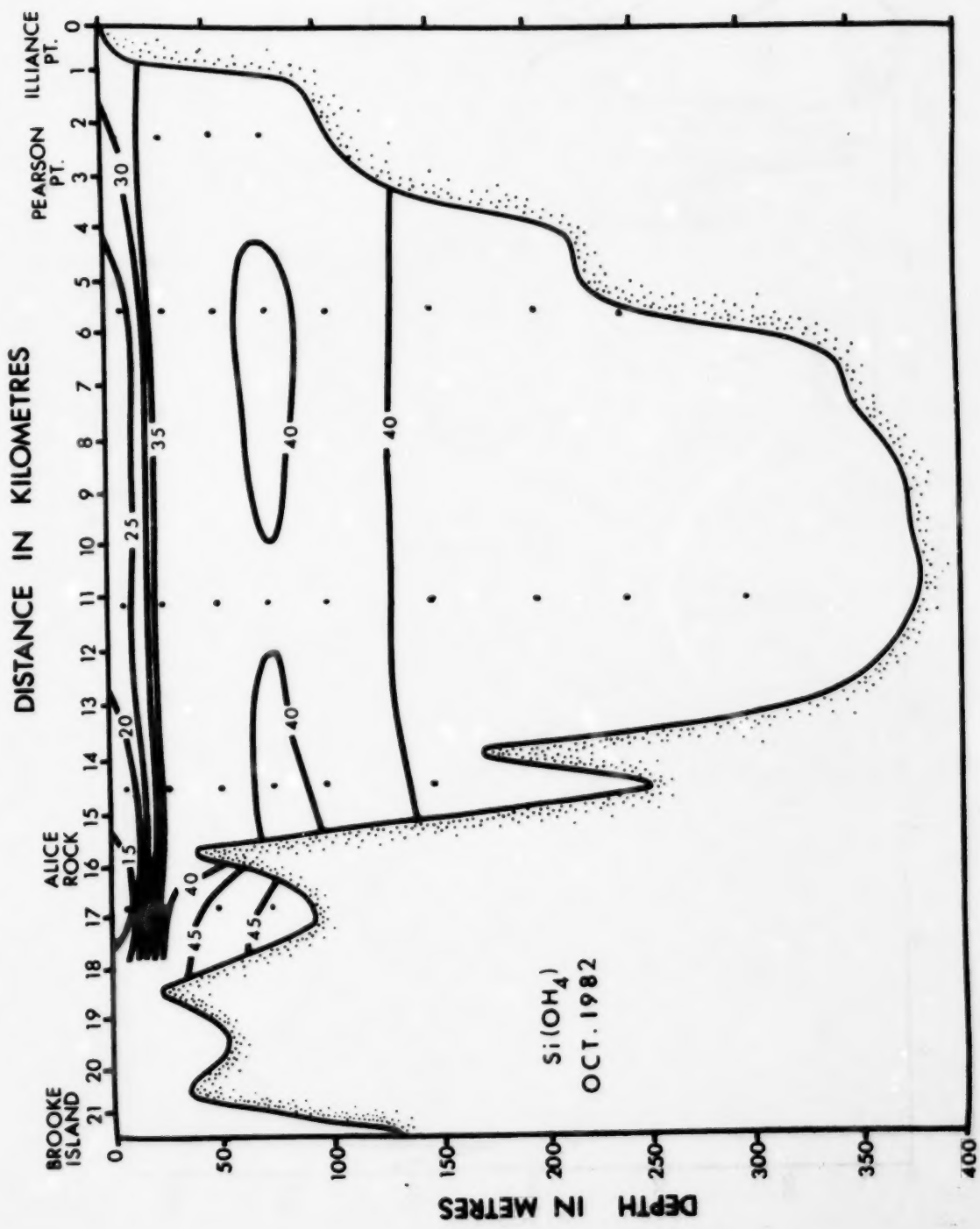

DISTANCE (km)
DEPTH (m)
Alice Rock
ALICE ARM
HASTINGS ARM
PO4
OCT.1982
1
2
2·5
2·75

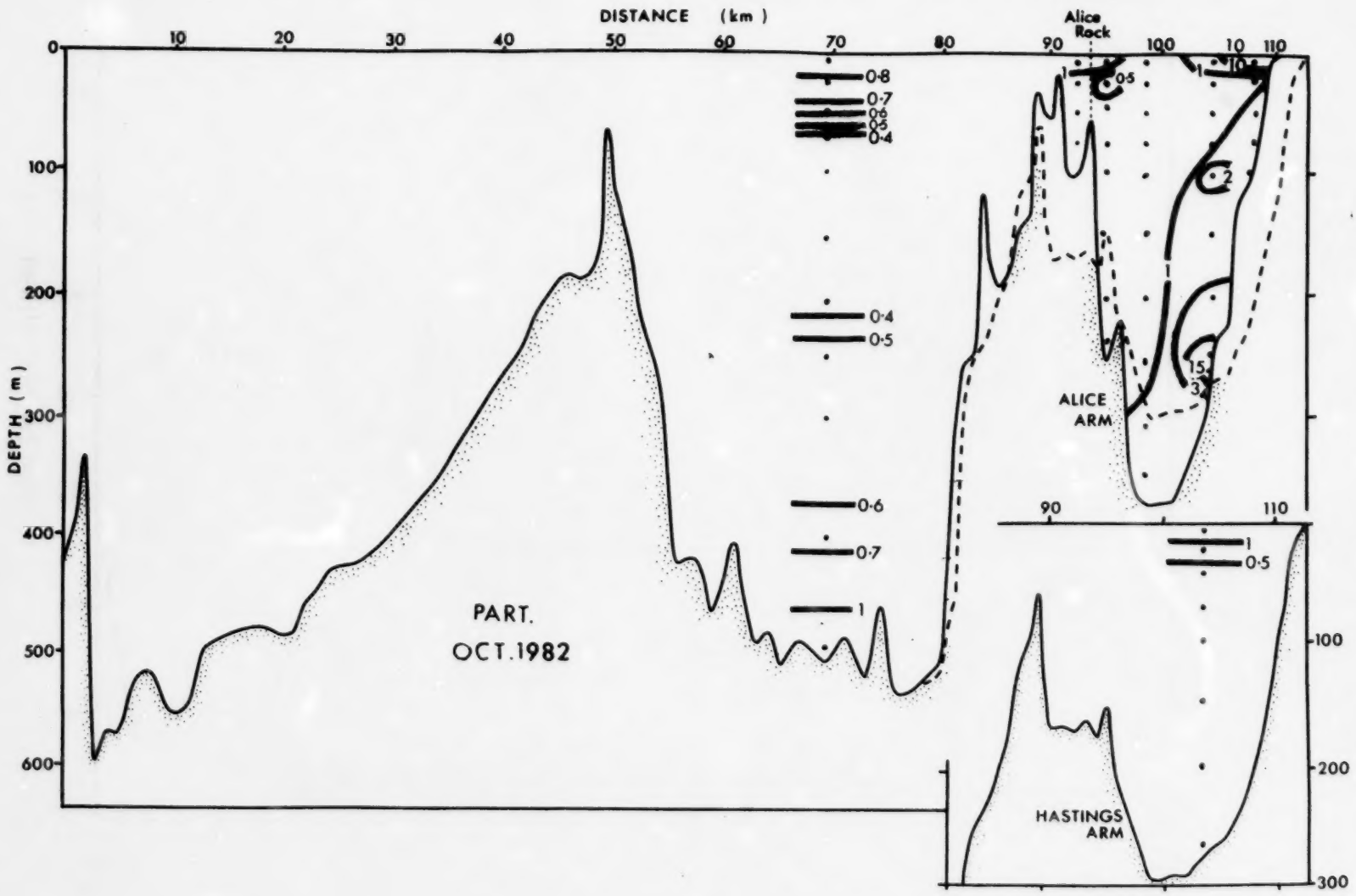

DISTANCE IN KILOMETRES
BROOKE ISLAND
ALICE ROCK
PEARSON PT.
ILLIANCE PT.
DEPTH IN METRES
PO4
OCT. 1982
1
1·5
2
2
0
50
100
150
200
250
300
350
400

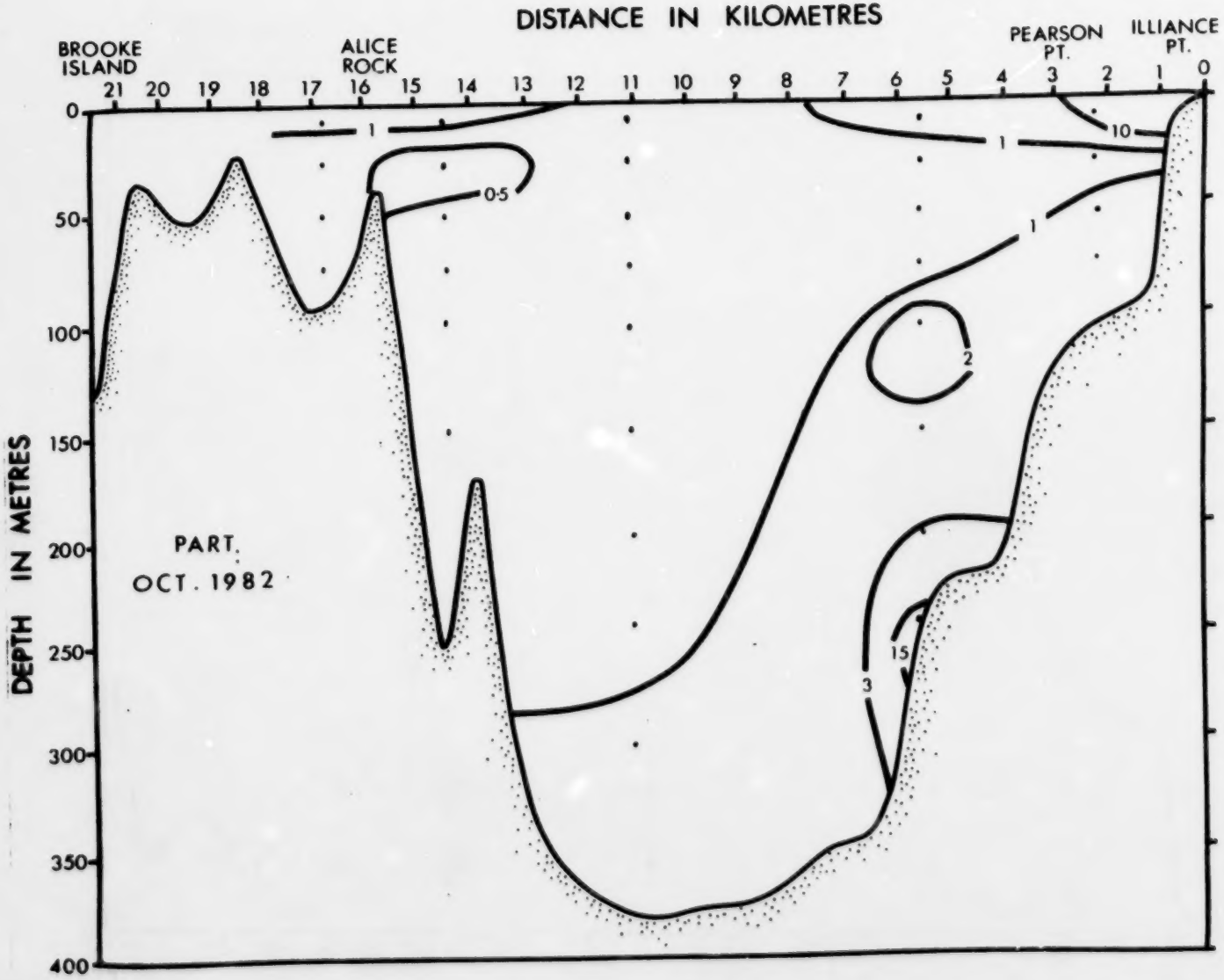

DISTANCE (km)
Alice Rock
DEPTH (m)
NO3
OCT.1982
ALICE ARM
HASTINGS ARM

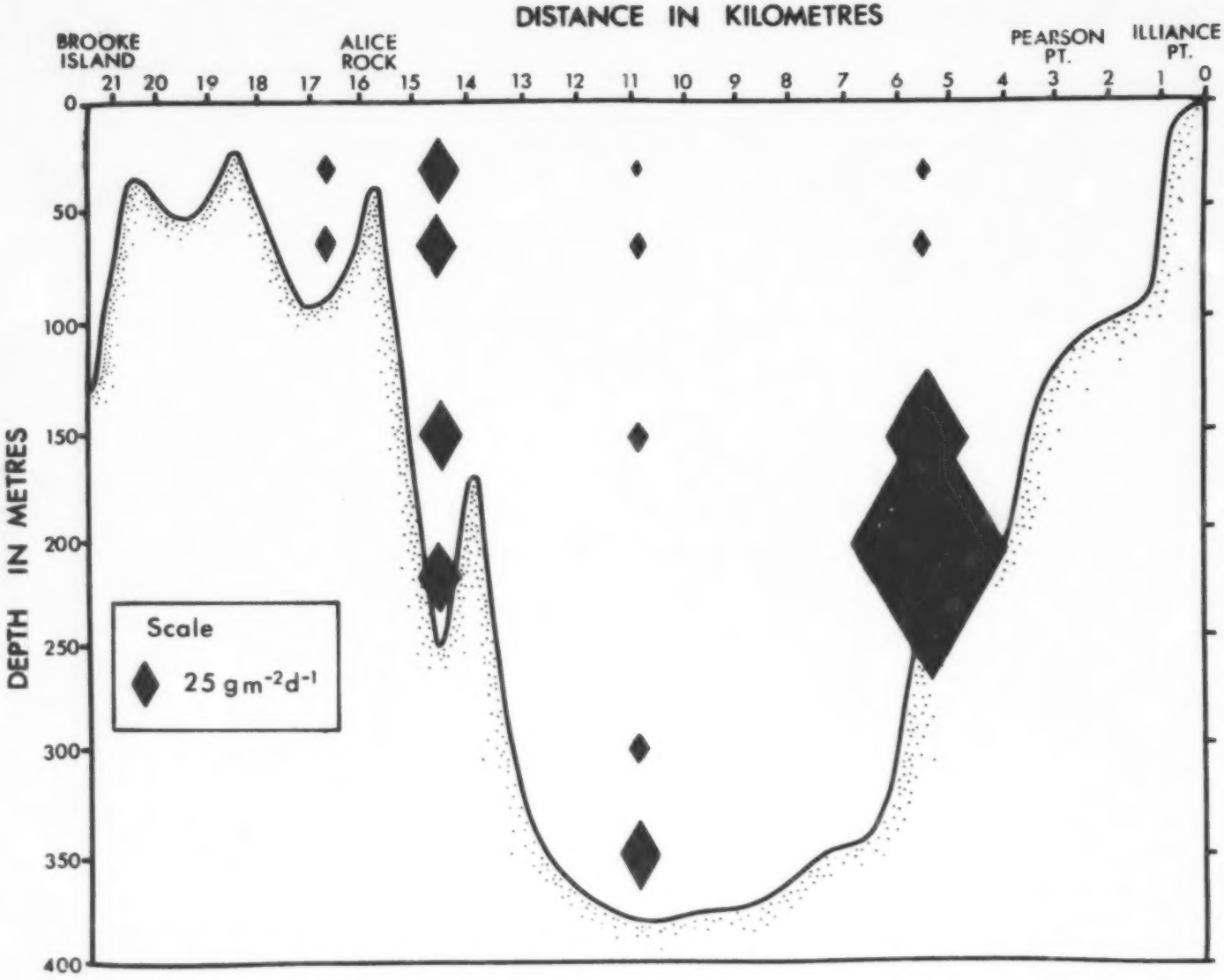

DISTANCE IN KILOMETRES
DEPTH IN METRES
BROOKE ISLAND
ALICE ROCK
PEARSON PT.
ILLIANCE PT.
NO_3
OCT. 1982


DISTANCE (km)
Alice Rock
DEPTH (m)
Si(OH)4
OCT. 1982
ALICE ARM
HASTINGS ARM


DISTANCE IN KILOMETRES
BROOKE ISLAND
ALICE ROCK
PEARSON PT.
ILLIANCE PT.
DEPTH IN METRES
Si(OH4)
OCT. 1982


DISTANCE (km)
Alice Rock
DEPTH (m)
0
100
200
300
400
500
600
10
20
30
40
50
60
70
80
90
100
110
0·8
0·7
0·6
0·5
0·4
0·4
0·5
0·6
0·7
1
PART.
OCT.1982
ALICE ARM
HASTINGS ARM


DISTANCE IN KILOMETRES
BROOKE ISLAND
ALICE ROCK
PEARSON PT.
ILLIANCE PT.
21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
DEPTH IN METRES
0
50
100
150
200
250
300
350
400
1
0·5
1
10
1
2
15
3
PART.
OCT. 1982



SEDIMENTATION in ALICE ARM SEPT. '82

POOR

QUALITY

ORIGINAL